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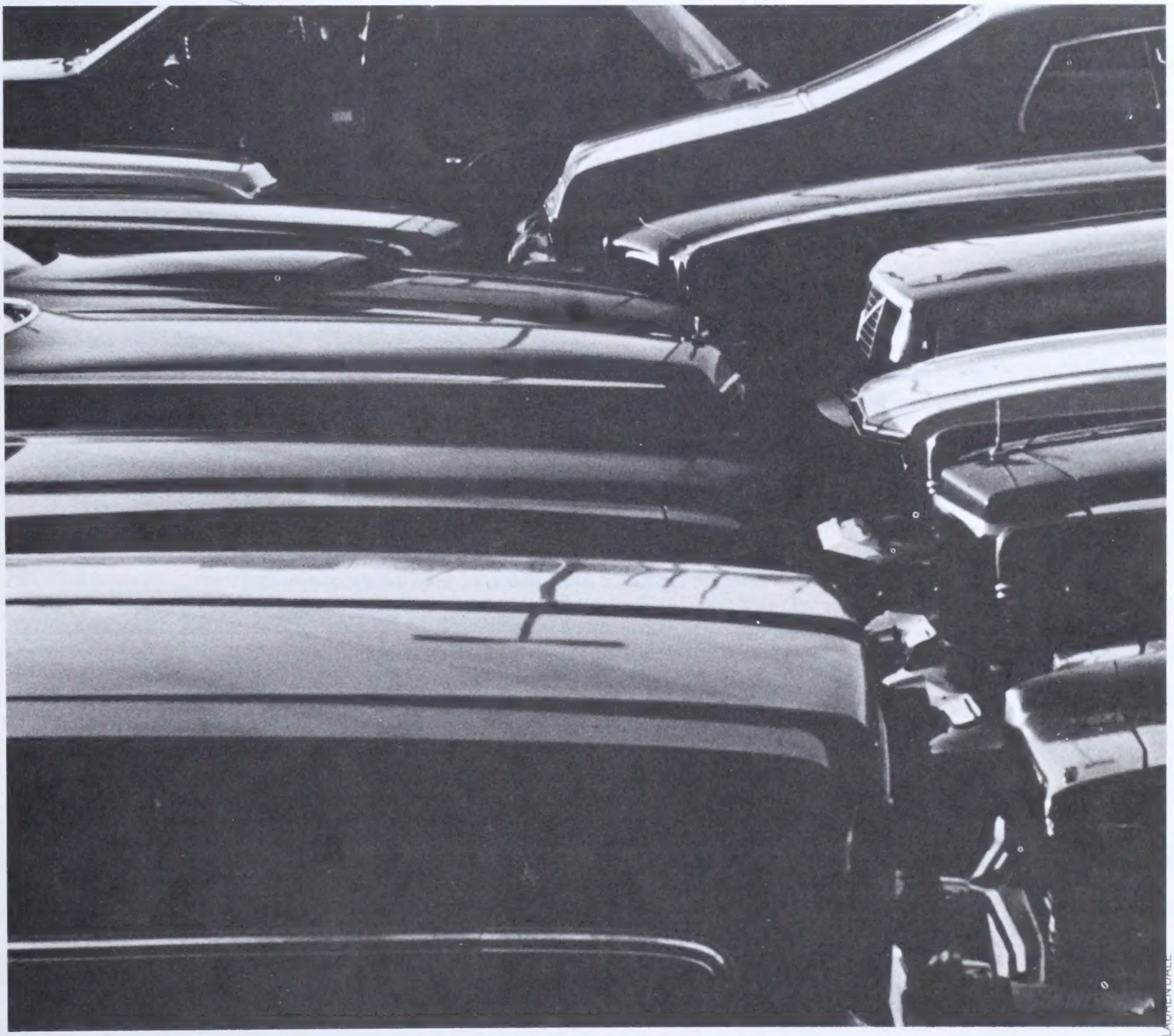

LAUREN DALE

Automobiles and the Environment

ISSN 0701-9637

ENVIRONMENT VIEWS

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Environment Views is published bi-monthly by Alberta Environment. Each issue deals with a specific topic from various viewpoints with the aim of increasing awareness of environmental issues among Albertans. The views expressed by the publication are not necessarily those of Alberta Environment.

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VIEWS

Student's guide: Automobiles and the Environment

Prepared by Dan Stoker
Environmental Education Co-ordinator
Alberta Environment

The following questions relate to the articles in Environment Views, Volume 1, No. 5 on Automobiles and the Environment.

Introduction: **Mobility at a Price**

1. Early in the introduction, seven items were referred to as "the broader costs incurred by the environment." Reorder the seven in a list, putting what you consider to be the most serious problem first and the least serious last. Explain why you made the first and last selections as you did.
2. Many Canadians currently depend on the continued use of the individual automobile for their livelihood. In the ninth paragraph of the introduction seven occupations are mentioned. Add seven or more occupations to this list.
3. Prepare a pie graph, eight centimetres in diameter, to illustrate the proportions by weight of the various materials used to make up the 1,431 kg weight of a 1978 Malibu.
4. The following short questions review some of the facts presented in the introduction.
    - i) What percentage of the automobile scrap generated each year in Alberta ends up being reprocessed?
    - ii) What are some of the things referred to as "gook" that appear in highway run-off?
    - iii) Approximately what percentage of a city's inhabited land area is consumed by the car's requirements?
    - iv) What are the two major byproducts released into the atmosphere as a result of the combustion of gasoline in a car engine?
    - v) What statistic is given for the annual consumption of gasoline in Canada?

The Automobile and Urban Land Use

1. Why is Calgary considered unique among Canadian cities with regard to automobiles?
2. One quote in this article was: "Why have jobs on one side of the city and homes on the other?"
    - i) What argument(s) might be given to support the separation of homes and work places?
    - ii) What argument(s) might be given in support of having people located closer to their work areas?
3. Alderman Husband offers at least three suggestions to remedy some of the problems concerning city transportation. Paraphrase each in a sentence.
4. To get an idea of the importance of cars as modifiers of our local communities, here's a suggested mapping activity.

    Select a block or two along a local main road in your community for the purpose of a survey. On a plain white piece of paper, draw two lines about three centimetres apart down the centre of the page from top to bottom. Now assume that the lines represent the borders of a street. Draw in, along the street, all the features that exist for the car's sake, i.e. parking stalls and lots, service stations, traffic signs and lights, parking meters.

The Four Wheel Drive Free-For-All

1. What legislation exists to control four-wheel-drive vehicle use in the wilderness country?
2. In which ways do 4x4 vehicles present a greater threat than motorbikes?
3. The 4x4 clubs are presented in this article as groups of people interested in sticking to conservation rules. What sort of a person, in what type of a situation, must one then assume is the source of the problem, if it exists?

Toll of the Tailpipe

1. What follows are some questions on facts presented in this article:
    - i) At what efficiency do cars convert gasoline to mechanical energy?
    - ii) What feature of the engine environment causes the formation of nitrogen oxides?
    - iii) What three factors need to be present to form photochemical smog?
2. Why is so much more carbon monoxide emitted in Edmonton than in Calgary?
3. What environmental features in Calgary have caused it to be one of the worst cities in Canada for carbon monoxide levels? Explain how these features work to cause the problem.
4. How does the cold contribute to the air pollution problems in Alberta?
5. List the actions under the label "proper maintenance" which will help decrease auto emissions.
6. In the table that follows, the percentage contribution of pollutants contributed by Calgary's (gasoline-powered) motor vehicles has been left for you to compute. In each case, the percentage contribution from the various sources adds to 100.00 per cent.

Relative Contributions from Different Sources for Three Major Air Pollutants in Calgary, 1973

SOURCE	CARBON MONOXIDE	OXIDES OF NITROGEN	HYDROCARBONS
Motor vehicles (gasoline)	?	?	?
Motor vehicles (diesel)	1.8	27.0	1.9
Industry	0.1	17.8	13.0
Aircraft	0.4	0.4	0.8
Natural Gas Combustion	0.3	17.1	3.1
Locomotives	0.1	1.0	0.5
	100.0	100.0	100.0

7. If the 1973 total for oxides of nitrogen emitted by locomotives in Calgary amounted to approximately 123 tonnes, how many tonnes of oxides of nitrogen were produced from all sources combined?
   Suggestion: For more information on air pollution emissions in Edmonton or Calgary write to Alberta Environment, Communications Branch, 14th Floor, 9820 106 St., Edmonton T5K 2J6 and request either ***Inventory of Air Pollution Sources and Emissions in the City of Calgary, 1971*** *or* ***Inventory of Air Pollution Sources and Emissions in the City of Edmonton, 1971.***

"Those Darn Emission Control Devices"

1. In a sentence or two explain why you might, under certain circumstances, be able to support the idea of having regulations making it illegal to tamper with pollution control devices.
2. In a sentence or two explain why, under certain conditions, you might not support the regulations described above.
3. In your own words, and preferably with a simplified diagram, describe any two of the six devices explained in the article.
4. What advantages to using lead-free gas are claimed in the article?

The Customizing Craze

1. A number of possible explanations are provided in this article to answer the question of why people customize their vehicles. In a paragraph or two explain what you think is (are) the reason(s) behind customizing.

Obsolescence and the Car Industry

1. In your own words, write a sentence to explain the meaning of:
   i) obsolescence of quality,
   ii) obsolescence of function,
   iii) obsolescence of desirability.
2. How are cars compared to women's fashions?
3. How have a) the greater variety of models; and b) certain types of car design; added to the cost of maintaining vehicles, according to the sources quoted?
4. According to the August 1978 issue of *Canadian Consumer* (a magazine possibly obtained in your library), "it's not at all unusual for an exhaust system to fail in the first six months of use." In their words, it's "a guaranteed pain in your car's rear end."
   Consider that, at $25 per car per year, a conservative annual estimate of the cost of maintaining Canadian cars' exhaust systems is $225 million. And consider that, in 1975, 89 people died in automobile-related carbon monoxide poisonings. Finally, consider that some traffic consultants believe carbon monoxide leaking into a car from a faulty, rusted system may account for a great many auto accidents. It would appear that obsolescence of quality in mufflers is a serious concern.
   In a few sentences for each, describe how the following relate to the muffler problem:
   i) Canada's climate--the winters
   ii) Wasted resources
   iii) Employment and small business opportunities
   iv) Your health
5. Herb Grey, a former Member of Parliament and Minister of Consumer and Corporate Affairs, has been quoted as saying "our motor vehicle laws are inadequate. We should definitely be closer to American law. As it stands here, manufacturers simply have to tell the owner of a car that there is a defect and what should be done to fix it. The manufacturer is under no obligation in law to recall a vehicle or to fix it."
   Do you agree that the situation is inadequate? Give at least two reasons to support your position either way.

The Recycling Role of Auto Wreckers

1. Which parts of a car tend to be the most durable and therefore of most value to auto wreckers?
2. In a paragraph or two describe whether or not you feel auto wrecking operations are, generally speaking, an asset to society.

Alternatives to the "One-Person, One-Car" Syndrome

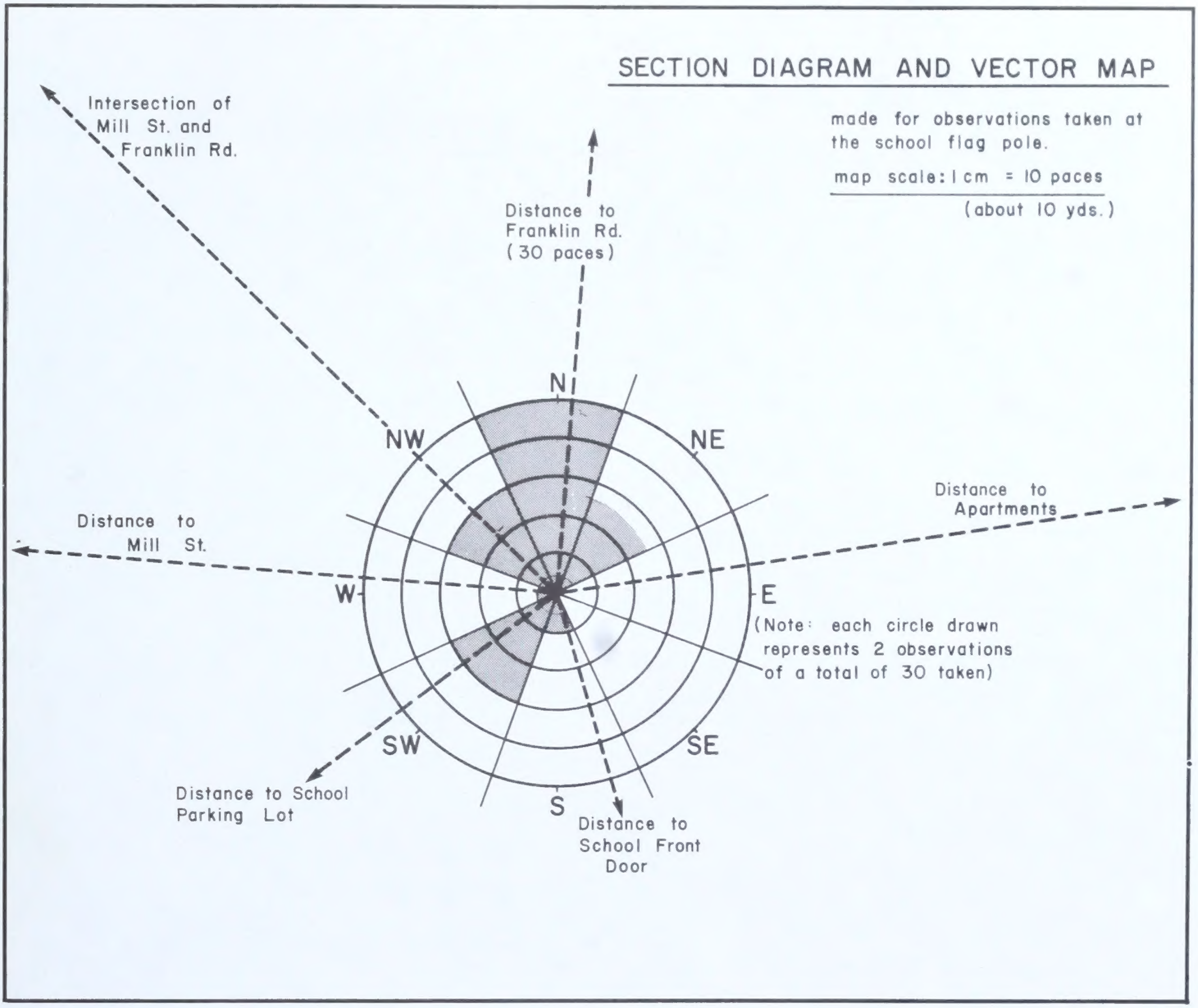
1. Is it fair to cast the car as a 'villain'? Make two lists, one to identify the advantages to individuals of owning their own cars, and the other to identify the disadvantages.
2. How does Lawrence argue a need for bus lanes in cities?
3. What are some of the arguments for and against having no-fare service on buses, under which operational costs are paid entirely through taxes? Give at least two arguments for, and two against. You might consider things such as the effects on the use of buses, the number of traffic tie-ups, the cost, the need for bigger and better roads, etc.
4. Why does Lawrence maintain that "transportation and communication (should be) viewed as one concept?"
5. Give three examples of changes currently taking place to support the view that, in fact, automobiles are evolving.

A Field Study on Transportation and Other Noise Sources

What follows is an outdoor experiment that can be performed by students with a minimum of equipment and supervision.

General description of experimental design

Two students working at a particular study site in the schoolyard (or at a neighboring park, shopping centre, apartment building, etc.) note the compass direction from which the loudest sounds are heard at timed intervals. Twenty-five, 30 or more observations are taken at the site, directions are recorded and later graphically displayed, preferably on a vector map which shows the distances to major features around the site. A hypothetical *vector map* and *sector sound diagram* are shown below.


SECTION DIAGRAM AND VECTOR MAP
made for observations taken at the school flag pole.
map scale: 1 cm = 10 paces
(about 10 yds.)
Intersection of Mill St. and Franklin Rd.
Distance to Franklin Rd. (30 paces)
Distance to Apartments
Distance to Mill St.
N
NE
E
SE
S
SW
W
NW
(Note: each circle drawn represents 2 observations of a total of 30 taken)
Distance to School Parking Lot
Distance to School Front Door

Materials required

1. A compass (or a circular piece of paper divided into eight sectors of the compass--N, NE, E, SE, S, SW, W, and NW).
2. A watch with a second hand (or stopwatch).
3. Pencil, data record sheet, and clipboard.
4. A blindfold, a tape-measure (optional).

General account of method

Two students establish themselves at the study site, one blindfolded and functioning as the listener, the other acting as the timer and recorder. The recorder places the compass on the ground near the listener with north oriented to north (similarly with the circular paper, preferably weighted down by a stone to prevent it from moving).

The recorder waits for the second hand on his or her watch to reach 12, 3, 6, or 9 and softly says "now." The listener points in the direction of the loudest sound heard in the next few seconds, or the source of the first audible sound. The recorder notes on his or her data sheet the direction in one of the eight possible sectors (N, SW, etc.). As soon as the recorder has finished recording the direction, the process is repeated. Note that it is not necessary that each recording be 15 seconds apart, for the recorder may be still recording the previous data when the second hand is passing the next 12, 3, 6 or 9. Repeat 25, 30 or more times for the site. The time that the data was recorded, possibly along with weather conditions (winds) should also be recorded. Next pace off the distances from the site to major features in the neighboring vicinity. Note the distance and direction of each major feature considered.

The experimenters have a number of courses of action at this point:
i) repeat the experiment changing duties,
ii) repeat the experiment at a different time,
iii) place a sound barrier near them and repeat the experiment,
iv) repeat the experiment at other positions closer and/or farther from the major noise sources.

Follow-up

1. Prepare a Sector Sound Diagram for the site.
2. Prepare a Vector Map for the site.
3. Summarize in a paragraph the nature and origin of sounds affecting the site.
4. Describe in a few sentences how noise levels at the site might be reduced.

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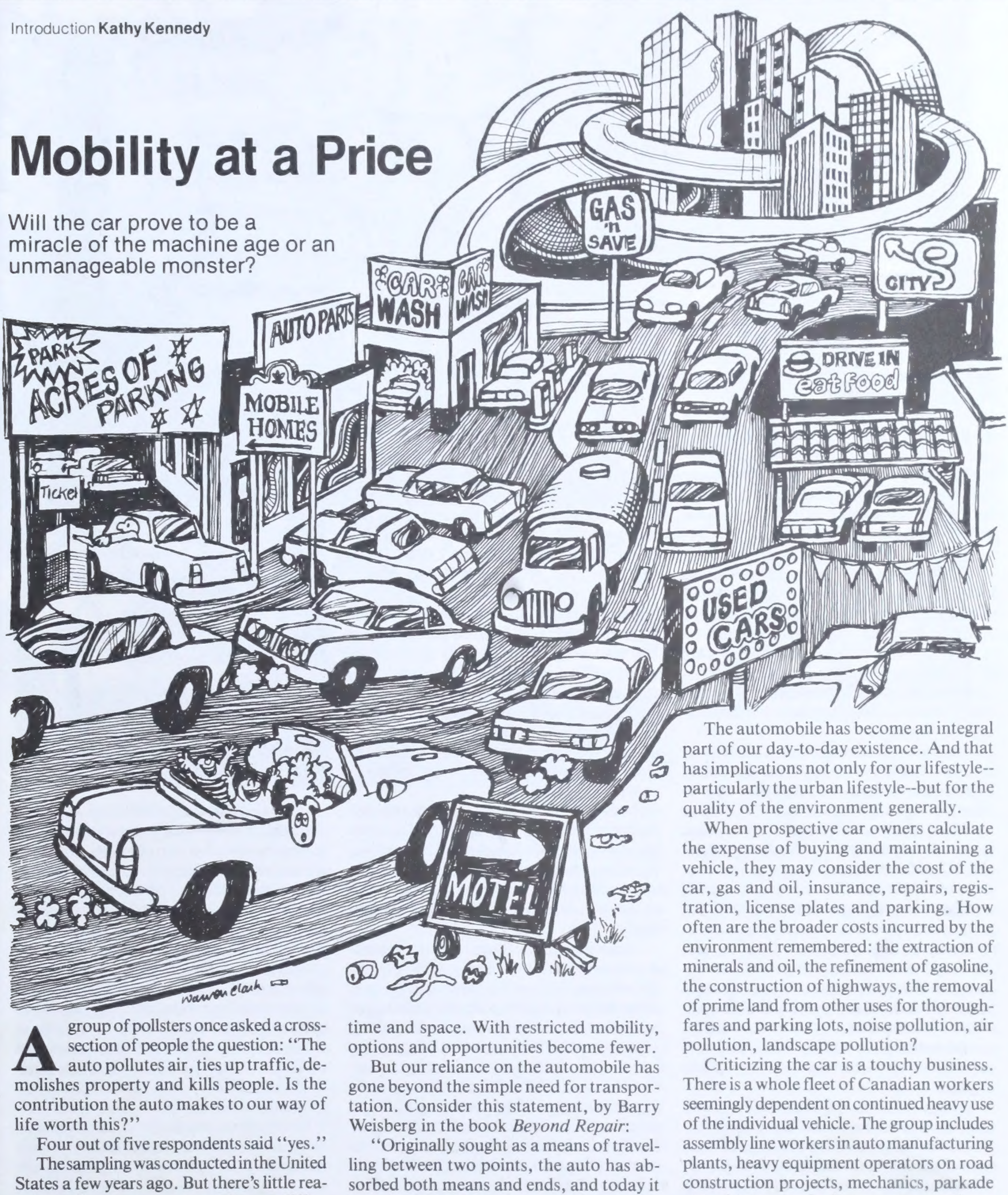
Introduction **Kathy Kennedy**

Mobility at a Price

Will the car prove to be a miracle of the machine age or an unmanageable monster?



A group of pollsters once asked a cross-section of people the question: "The auto pollutes air, ties up traffic, demolishes property and kills people. Is the contribution the auto makes to our way of life worth this?"

Four out of five respondents said "yes."

The sampling was conducted in the United States a few years ago. But there's little reason to believe the answer would be any different among the owners of 800,000 passenger cars in Alberta today.

Cars allow us to reorder our surroundings faster than stagehands can change a theatre set; they free us from natural constraints of time and space. With restricted mobility, options and opportunities become fewer.

But our reliance on the automobile has gone beyond the simple need for transportation. Consider this statement, by Barry Weisberg in the book *Beyond Repair*:

"Originally sought as a means of travelling between two points, the auto has absorbed both means and ends, and today it is used as much for eating, watching movies, banking, making love, courting, establishing status, mailing letters, listening to the radio, watching TV, 'getting away from it all,' sleeping, camping, hunting, living, and not least, dying."

The automobile has become an integral part of our day-to-day existence. And that has implications not only for our lifestyle--particularly the urban lifestyle--but for the quality of the environment generally.

When prospective car owners calculate the expense of buying and maintaining a vehicle, they may consider the cost of the car, gas and oil, insurance, repairs, registration, license plates and parking. How often are the broader costs incurred by the environment remembered: the extraction of minerals and oil, the refinement of gasoline, the construction of highways, the removal of prime land from other uses for thoroughfares and parking lots, noise pollution, air pollution, landscape pollution?

Criticizing the car is a touchy business. There is a whole fleet of Canadian workers seemingly dependent on continued heavy use of the individual vehicle. The group includes assembly line workers in auto manufacturing plants, heavy equipment operators on road construction projects, mechanics, parkade attendants, gas jockeys, auto wreckers, drive-in restaurant waitresses.

Before anyone starts to panic, suffice it to say that the car is not likely to fade out of the picture in the foreseeable future; although it may change and there may be some redirection of priorities and work forces to alternative transportation systems, the automobile appears too firmly linked with our lifestyles to disappear.

And its popularity is on the rise. Federal government statistics show an increase of more than 21 per cent in the number of passenger car registrations in Canada between 1972 and 1976. In only four years, the number rose from 7.4 million to just over nine million autos registered!

But the increasing number of vehicles on our roads is a growing challenge to those charged with the environmentally-related chores of finding and extracting resources, ensuring clean air and planning cities.

Let's consider the environmental impact of the automobile under four main categories: the use of non-renewable energy and minerals, air quality, land use, and disposal and recycling.

Energy use is a straightforward matter; cars need fuel in order to operate. According to Statistics Canada, total net sales of gasoline throughout the country in 1977--sales on which taxes were remitted at road-use rates--were reported at 7,320 million gallons (33,277,000,000 litres), up three per cent from the 1976 total. The amount consumed in Alberta rose eight per cent from 1976, the greatest increase of any province.

However, a publication of the Saskatchewan environment department claims the automobile's combustion engine converts fuel to mechanical energy with an efficiency of less than 40 per cent: "In terms of energy use the automobile is a very inefficient and expensive way to move people from place to place."

Energy, of course, is also used to power auto manufacturing plants. The production process consumes millions of tonnes of non-renewable minerals annually as well, although auto manufacturers are decreasing the weights of their vehicles, thereby cutting down on materials used and gasoline necessary for propulsion.

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To give an idea of the resources that go into one car--aside from man-hours and energy used to run a manufacturing plant--a 1978 Malibu Classic, whose weight has been pared 555 pounds (250 kg) over its 1977 counterpart, contains nearly 2,000 pounds (900 kg) of steel, 475 pounds (214 kg) of iron, 105 pounds (47 kg) of aluminum and aluminum alloy, 24 pounds (11 kg) of copper and copper alloy, 26 pounds (12 kg) of lead and lead alloy, three pounds (1.35 kg) of nickel and nickel alloy, and 20 pounds (9 kg) of zinc and zinc alloy.

It also contains 105 pounds (47 kg) of glass, 170 pounds (77 kg) of plastic and 85 pounds (38 kg) of rubber, as well as other materials for a total net weight of 3,180 pounds (1,431 kg).

Motor vehicles are a major contributor to air pollution in Alberta's cities. The combustion engine, which burns fuel incompletely, is the culprit, creating potential hazards on the urban Alberta scene in concentrations of nitrogen dioxide, ozone and carbon monoxide.

According to the Saskatchewan government publication, for every 1,000 gallons (4,546 litres) of gasoline consumed by cars, approximately 12,000 pounds (5,400 kg) of water are released into the atmosphere along with about 18,000 pounds (8,100 kg) of carbon dioxide, 3,000 pounds (1,350 kg) of carbon monoxide, 20 to 75 pounds (nine to 34 kg) of nitrogen oxides including nitrogen dioxide, 200 to 400 pounds (90 to 180 kg) of partly-burned fuel or hydrocarbons, two pounds (.9 kg) of ammonia and half a pound (.23 kg) of solids such as zinc, lead oxides and carbon.

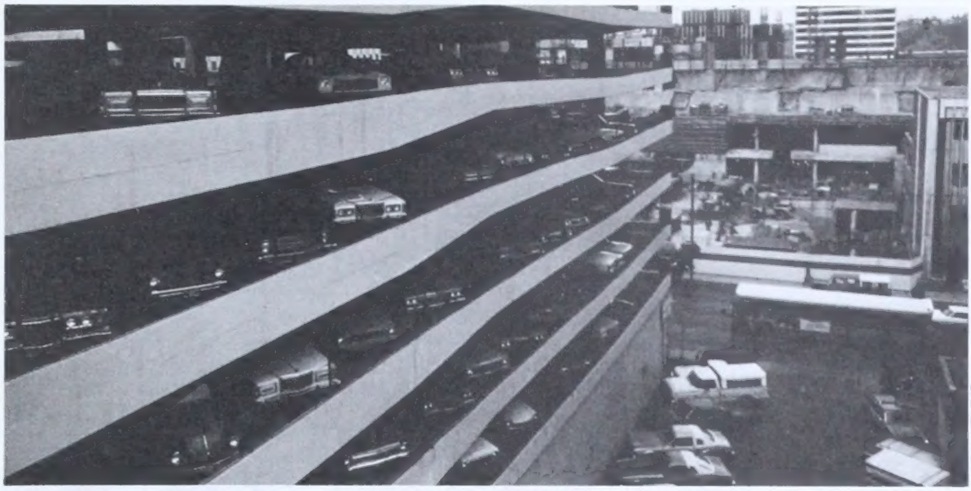
Photochemical smog is the most visible result of automobile pollution. It results from the combination of nitrogen oxides, hydrocarbons and other compounds in the presence of sunlight.

Gosh! Without the emission control Gubbins the motor looks like a plucked chicken!

The air pollution problem in Alberta's cities hasn't reached the proportions depicted in a cartoon of a few years ago, which showed a weatherman making the following report: "Our latest analysis of the stratosphere, Dr. Figby! . . . 21 per cent hydrogen, seven per cent oxygen . . . and 72 per cent automobile exhaust fumes!"

But monitoring stations operated by Alberta Environment's pollution control division in Edmonton and Calgary have documented a number of 24-hour periods in which the levels of the three aforementioned pollutants--nitrogen dioxide, carbon monoxide and ozone--have exceeded provincial air quality standards.

The federal government has strengthened its emission control requirements for cars manufactured in Canada, but once the cars are sold and on the road in Alberta there are no legislative sanctions against removing or unhooking pollution control equipment. A pollution control division spokesman in Calgary, in fact, said an emission testing program in October turned up cars just out of the showroom which exceeded allowable



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emission levels. Most newer cars, however, had better results than cars of the 60s and early 70s.

Land use is becoming an increasingly important topic as the needs of the automobile demand more and more space in the form of sophisticated roadway systems with plentiful lanes and interchanges. Parking lots, garages and driveways also prohibit the use of land for parks, pedestrian malls and housing. In fact, about 30 per cent of a city's inhabited land area is consumed by the car's requirements.

The problem has been aggravated by the movement of people into growing suburbs. Suburban dwellers usually have further to drive for work or pleasure, yet because their neighborhoods are settled relatively sparsely the roads that service them are inefficiently used.

Not only is the landscape often cut up by a network of roads to cities, suburbs and towns, but some people would say the scenery has also deteriorated because of phenomena associated with the car: billboards along highways, beer cans in the ditches, strip service areas consisting of a long row of gas stations, used car lots, drive-ins and so on.

The building of highways also poses soil erosion problems for the environment. During construction, 10 to 35 acres of land are stripped by the bulldozer for every mile (1.6 kilometre) of limited-access, divided highway.

Other highway-related problems include excessive noise levels near housing developments and "gook" in highway runoff. The latter includes oils and other liquids from passing cars, salts used to melt ice and snow, litter and residues of herbicides used to keep down roadside vegetation.

Finally, what happens to the car when it wears beyond repair, rusts, wrecks or becomes just too expensive to maintain? Thousands of automobiles are discarded in Alberta each year, and while some of them are taken to auto wreckers others are abandoned along roads, in vacant lots or yards, becoming eyesores.

The provincial government has a program to encourage the collection and recycling of derelict vehicles. But according to a 1977 study done for Alberta Environment's waste management branch, only about 22,500 tons (20,250 tonnes) of automotive scrap are processed annually, out of an estimated 57,000 tons (51,300 tonnes) available.

Metal is not the only component of old cars that can be recycled. Rubber from old tires can be used to concoct a rubberized asphalt for street pavement. Glass can be collected, crushed and remelted.

But it all requires a mobilization of money, technology and willpower, which hasn't yet occurred on any scale.

The automobile. From its inception--the deep digging into the earth for metals and energy--to its final ignoble crumpling in the teeth of a crusher or under the beating of wind and water, it has a profound effect on our natural and social environments.

The articles that follow detail its influences. They also look at the future of transportation, at the pros and cons of alternatives to the one-person, one-car syndrome. Are there, indeed, better ways to go?

The automobile industry itself takes a predictably optimistic view of its capability to adapt to meet tougher requirements imposed by the government and demanded by the public.

The industry's perspective was summarized in the 1977 report of the federal government's automotive task force: "The view generally expressed is that the motor vehicle industry has the necessary financial and physical resources available to achieve desirable improvements in fuel economy, safety and emission while also meeting other factors affecting the prospects for the automobile such as development costs, operating costs and performance.

"If these achievements are possible for the industry then the automobile will continue to perform its major role as the most popular method of personal transport."

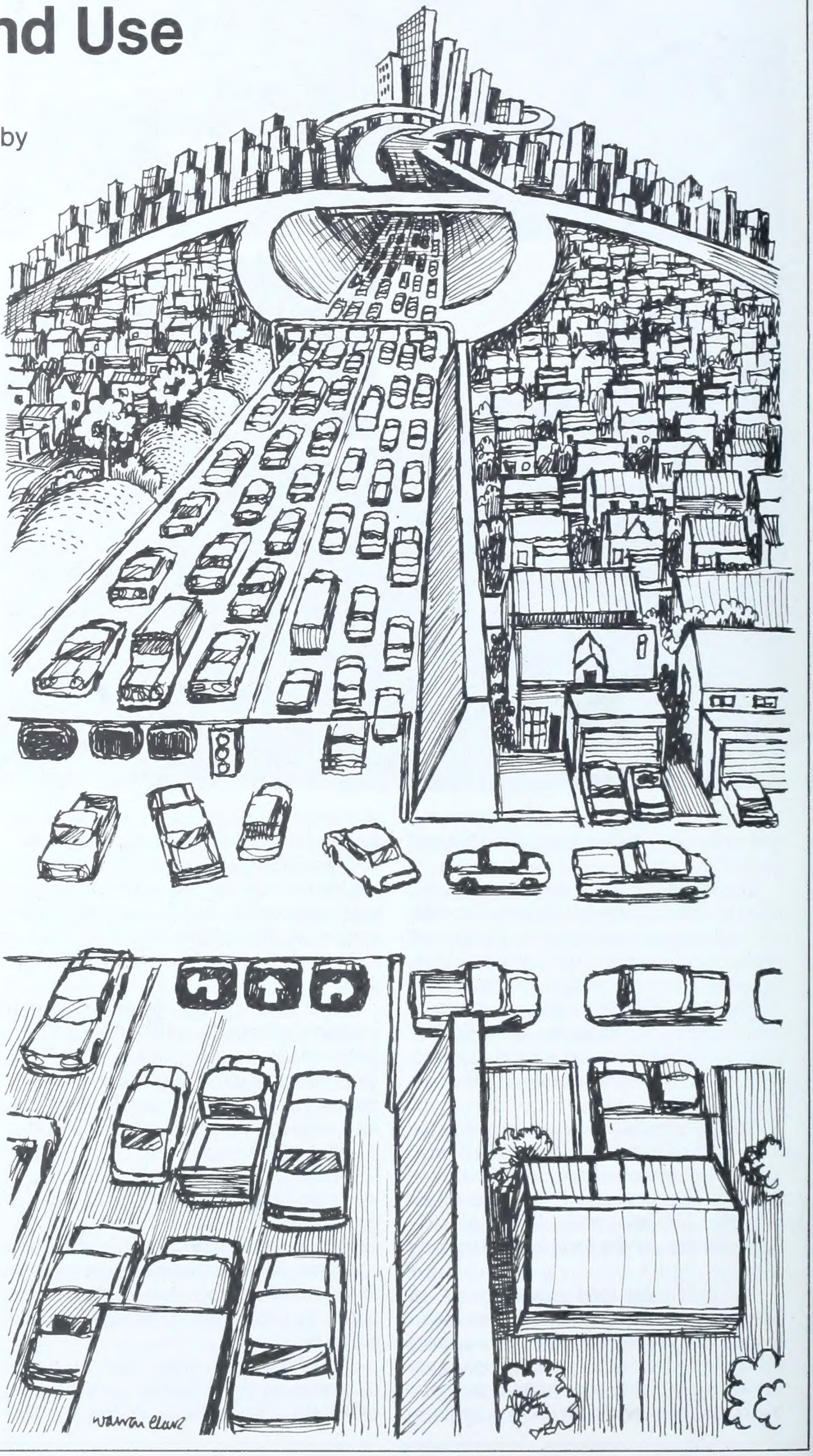
The next 10 to 20 years should tell whether the car will truly be the miracle child of the machine age--or a malconceived misfit.

Kathy Kennedy is the freelance editor of this magazine.

Sharon Adams

The Automobile and Urban Land Use

Roughly a fourth of our cities' inhabited land area is consumed by the car and its needs



Roadway system in Edmonton's river valley, showing the Low Level bridge.

The first cities were compact communities, where people lived elbow to elbow for protection and trade. Streets were only wide enough for two people to pass, and artisans set up shop in their homes, assured of a steady stream of customers.

The industrial and agricultural revolutions caused the cities to grow, but it was a revolution in transportation--ultimately the private automobile--that stretched the city all the way out to the suburbs.

By the 19th century it was a sign of affluence to maintain a country residence, away from the city's smoke, noise and commonfolk, to which one could occasionally travel by coach.

By the latter half of the 20th century it was commonplace to jump into a car after work and drive half an hour or more to reach home in the suburbs--in developments carrying appropriate man's-home-is-his-castle names likes Tudor Village, Sherwood Park, Forest Lawn, Bramlea Green, The Woodlands, Mill Woods and Ranchland Estates.

But the fulfillment of that dream created another nightmare.

That kind of lifestyle today means a city must have thousands of kilometres of roadways--a costly network of concrete that must be constantly maintained.

Calgary and Edmonton both plan to spend billions of dollars on building, improving, upgrading and maintaining roadways to allow their citizens to drive right into the 21st century.

As much as 24 to 30 per cent of these cities' inhabited land area is consumed by the auto and its needs: local streets, roads, collector roads, throughways, parkades, overpasses, underpasses, interchanges, service stations and garages.

Even a substantial portion of the residents' own land is taken up by the auto's accessories: garages, sometimes large enough to store three or four autos, driveways, and expensive curbing and guttering to make on-street parking easier.

Recently even more land is being gobbled up for roadways--this time to offer suburban residents some protection from the car's

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noise pollution. All modern cities are dotted with berms, or long hills, usually landscaped, separating a housing development from a busy collector street.

But Calgary alderman Greg Husband warns it must all end.

"There is a price to be paid at some point. If we continue to behave this way, we will inevitably destroy the urban environment."

Cities should be places for people to live, he says, and people's needs are being overshadowed by the automobile.

"Transportation planners have been equating desires with needs," he says, and instead of trying to change the desires, cities are constantly a step behind trying to catch up.

He points out that building new interchanges and roads only relieves a congestion problem in the short term. Eventually another bottleneck will be created as motorists abandon alternate routes to take advantage of the new work.

"You can't just romantically think about the city as it was 20 years ago," says Calgary planning department director George Steber, explaining that we can't go back to the days when population was low and everything was easily accessible.

There have been many changes in 20 years in Alberta's cities. Among the largest changes are expectations: first-home buyers are demanding larger houses on larger lots. And an automobile is no longer a luxury item.

Calgary is perhaps the best, or worst, example of how much the car has become part of the modern lifestyle.

Calgary has more cars per capita than any other Canadian city, with half a vehicle for each man, woman and child--double the number of cars in Montreal. In addition, 37 per cent of local households have two or more cars, compared to 22 per cent in Toronto and 29 per cent in Edmonton.

Yet the area of Calgary, 427 square kilometres, is roughly the same as that of the island of Montreal, which accommodates four times the population, 2.5 million people.

Why is it Calgarians need twice as many cars as Montrealers to traverse the same amount of area?

Steber explains density is the factor.

Although the same roughly 30 per cent of land area is taken up in roadways, they are less efficient in suburbs (Calgary is largely a suburban city) where the density is 22 people per acre, than in urban areas, where the density can range between 150 to 200 people per acre.

But high density living is anathema to many Calgarians, and westerners in general, whose forebears were attracted by the wide open spaces.

C. G. R. Halls, director of strategic planning for the provincial transportation department, agrees it's not the space given to roads, but their efficient use, that's the problem.

"A certain amount of land area has to be given over to utilities, and roads are just one of those utilities. But it is desirable to make the best use of existing capabilities in utilities of any kind," he says.

Cities, in choosing to have high volumes of traffic flowing through the central business districts to promote "strong central cores," are contributing to the road use problem.

"One big problem is the spatial distribution of activities. Why have jobs on one side of the city and homes on the other?"

Cities are now reluctant to change their strategies, primarily because the downtown businesses are heavy taxpayers.

"I don't think the solution to this problem is physical, but mental. Getting city councils to think that businesses should be taxed on

Bye. See you tonight!
You'd think they had learnt by now!

what they are, rather than where they are, would make a big difference."

Calgary alderman Husband agrees concentrating people near jobs is a good idea.

"If people locate closer to work, we don't have to throw out a lot of money extending expressways for commuters. Expansion of the Crowchild Trail in the city's northwest is estimated to cost $65 million; of the Deerfoot Trail in the southeast, $80 million."

Although it will be an unpopular political move, he maintains the city government must take more control and be firm about road spending and planning.

The first step would be a massive public information campaign.

"Seventy per cent of the cars driven in this city have one occupant. Oil companies underwrite parking expenses so their employees can afford to park their cars downtown while they're at work. The whole thing is getting out of hand."

He suggests the city control all downtown parking, that less money be spent on developing roads and proportionately more be spent on public transportation, and that higher density housing, "but not necessarily high-rise housing" be encouraged.

"City administrators are always talking about the greater good for the greater community, but you can always identify who benefits and who loses in decisions of this nature. The way it's been going the people in the inner city are paying the cost to support the lifestyle of those in the suburbs by increased congestion, parking problems, noise pollution and traffic tie-ups."

If people choose to live in the suburbs, he says, they should be willing to trade off something in return. Longer time in transit to work is one trade-off, as are road systems suited to mass transit instead of the private vehicle, and lower property values as a result of all these factors.

"We have to regulate the auto to keep the urban environment liveable," he says.

City planner Steber suggests a move to mass transit as one solution. "I take the bus myself at great personal inconvenience."

But a change in city requirements for roads in suburbs is another partial solution; narrower roads might help. The right-of-way requirement now is 66 feet (20 metres), of which only 32 feet (10 metres) is paved, he points out.

But Calgary development consultant and president of the city's Housing and Urban Development Association, Don Bortoluzzi, holds out little hope that the expectations of the people of Alberta will change.

"We are a single-family, detached, suburban housing society. We want what our parents had, and that's what about 90 per cent of the people still strive for. Only about 10 per cent of the home buyers are looking at other alternatives--condominium or townhouse developments."

And," he says, "what they want they're willing, and at this time, able to pay for, regardless of the price tag attached."

One suggestion put forward by planners and environmentalists to reduce the land surface of cities taken up by cars and roads is cluster housing, in which houses are bunched together, served by smaller roads and no alleyways, and surrounded by park space.

But Bortoluzzi says similar projects in Winnipeg over the last two decades have been unsuccessful.

"It's too different a concept, and unless there's a great price differential, and at today's building prices there can't really be, then people aren't going to be interested."

Sharon Adams is a journalist in Calgary.

Myron Rockett

The Four Wheel Drive Free-For-All

The event: The Rocky Mountain House four-wheel-drive rally.

The setting: An excavation site behind a garbage dump, lent for the day by the provincial transport department.

The players: Members of 4x4 clubs, individual dirt bikers and crowds of men, women and children of all ages who have come out for an afternoon of vicarious excitement.

The scenario: Hundreds of eyes are glued to each vehicle as it plows through deep water and mud, leaps over cliff-like embankments, chews its way up much too steep hills or just plain gets bogged down in half a metre of muck. When it's all over, everyone leaves happy and unharmed--and the environment, significantly, is left unscathed.

How to keep the thrills alive and the environment intact

I attended the rally to see, first hand, four-wheel-drive vehicles in the process of destroying the environment. What I ended up seeing was probably the answer to the problem of allowing 4x4 fans and motorbikers their recreation without tearing up the wilderness.

Some compromise is certainly necessary, as conservationists complain of environmental damage, particularly to the Rockies' east slopes, and the vehicle operators counter that they are being made scapegoats for the harm done to the environment by logging and strip mining operations.

"We feel that our clubs are doing their part to preserve the environment," says Terry Keene, president of the Edmonton Chapter of the Mountain Cats. Club members, who come under strict conservation rules, do less damage than individuals at large, he explained.

"We have actually gone into camping areas and come out with more garbage than we brought in--garbage left by other campers."

The main intention of most clubs is good fellowship, adds Bill Trathen of the Plainsmen Club of Edmonton. "We are not terribly serious about racing or winning events, rather we like to get the whole family out and have an enjoyable afternoon or weekend. Just about all our members are middle-class working people. Very rarely are we approached by doctors, lawyers or other high income people."

Fully aware that the public is becoming increasingly unhappy with off-road activity, the clubs have been pressing the province to set aside areas for the use of all-terrain vehicles (ATVs). But they say there's been little response.

"Although our 4x4 association is continually trying to work with the forestry department, little headway has been made due to lack of interest shown by the department," said Trathen. "Rather than helping us govern ourselves, the only response we get from government is rejection and more restricted areas."

Darrell Pasuik of Alberta Energy and Natural Resource's forest land use branch says the foothill region, with its open, rolling country, seems to be the most popular area for four-wheel-drive fans. But grass and shrubs are torn out and the soil is cut by tires spinning or slipping. Vegetation normally holds the soil in place, but once it is torn out, the loosened soil is free to wash away in rain and runoff.

Once the erosion cycle begins it has a tendency to continue, said Pasuik. What began as seemingly insignificant tire tracks become gullies.

And the damage does not end there, said Sandy Rolsson, also of the forest land use branch. The erosion started by the 4x4s injects "thousands of tons" of silt into streams, creeks, rivers and lakes. The tremendous increase in sedimentation takes a heavy toll on fish spawning.

What happens is that sediment covers eggs layed in gravel beds, preventing fresh water and oxygen from reaching the eggs and keeping waste materials from being flushed away. Fish won't lay eggs if the sedimentation is thick. As well, their food supply--the life forms that live in the gravel beds--is destroyed.

Vehicles have actually been seen with engines submerged (amphibious engines) driving down creeks, said Rolsson. Some drivers take a creek in their path as a challenge.

The Off-Highway Vehicles Act defines off-highway vehicles, such as motorbikes with low-pressure tires, snowmobiles and swamp or dune buggies, said Pasuik, and other pieces of legislation, such as the Forest Act, restrict the use of such vehicles.

But if a four-wheel-drive vehicle is licensed as an on-highway vehicle, "it can go anywhere a car can go, on any public highway . . . a cutline, even."

And even if there is no cutline, unless a forestry officer sees a vehicle operator actually making a trail, the operator is not breaking the law, said Pasuik. "Once license plates are on (a four-wheel-drive vehicle) for a public highway, boy you've lost it."

The Fish and Wildlife Act says that no ATVs are to operate in certain areas such as the east slopes between midnight and noon during the hunting season, but aside from this restriction--and others imposed by legislation governing parks and designated wilderness areas--there are no controls on the use of ATVs.

Regions like Willmore have to be protected from off-road vehicles because the areas are very rich in animal and plant life, Rolsson said. No vehicles of any type are permitted, although hunting and fishing on foot are permitted. The natural beauty and solitude of the area has been largely preserved by the restrictions on vehicle use.

MYRON ROCKETT

Motorbikes tend to be destructive because they can handle many terrain types, said Rolsson. The bikes are very portable and can be disassembled and carried on foot over impassable obstacles.

But 4x4s cause much more damage to the areas they do travel over, said Pasuik. A 4x4 has greater width and tears up two tracks instead of one. The weight of the machine causes the tires to cut deeper into the soil, as well as packing down vegetation and soil. Four-wheel-drives tend to stick to trails. Rather than spreading the effect out over a wide area, the same track gets used many times and consequently gets very little chance to recover.

Motorbikes, on the other hand, have a greater toll on wildlife because of greater noise levels and wider-ranging capabilities, said Pasuik.

Clubs are fairly responsible, said Rolsson. It is the individuals "that leave their brains behind and head off into the wilderness that we are worried about." Lately there have been large numbers of complaints about these people, particularly about motorbikers. People are becoming fed up with the noise, careless attitudes and the number of underage kids abusing privileges.

Pasuik said his department was actively seeking out areas for the recreational use of vehicles. At present there is an off-road-vehicles area of two to three townships at McLean Creek in the Kananaskis country, where loading ramps, obstacle courses, mud baths and trails are being constructed. Next year a large project will begin at Ghost/Waiparous, northwest of Calgary, providing complete facilities.

If the rally at Rocky Mountain House is any indication these large recreational areas could end the conflict between four-wheel-drive users and the environment. In sponsoring such rallies--and field trips where enthusiasts explore remote areas accessible by forestry roads--the clubs can provide a valuable recreational outlet while helping preserve wildlands.

Myron Rockett is a freelance writer living in St. Albert.

Kathy Kennedy

The Toll of the Tailpipe

Motor vehicles are a major contributor to air pollution in Alberta's cities.

It's 4:30 on a fall afternoon in the city. Jack, feeling snappy in his glow-in-the-dark orange track suit and aerodynamically-designed sneakers, spins out of the men's washroom where he's stowed his suit and tie.

Then he breezes out the door of his office building, down the hill and along the river valley road, relishing his sleek image as he glides past co-workers stuck fuming in a traffic tie-up.

But hold it, Jack. Getting a little headache, perhaps some dizziness or even nausea? Despite your good intentions, your jogging could be doing you more harm than good.

Those cars snail-pacing along the road are collectively spewing out hundreds of kilograms of potentially-toxic air pollutants, including carbon monoxide, oxides of nitrogen and hydrocarbons. Particularly in a valley, where pollutants are trapped by stagnant air, and in the fall or winter when it takes the sun longer to 'burn off' inversions, running along side belching tailpipes may not be the path to physical fitness.

"I wouldn't ride a bicycle in downtown Calgary during rush hour," corroborates Dr. Nancy Smith, who has studied Calgary's carbon monoxide problem. "The dangers (from emissions) outweigh the health benefits."

Motor vehicles, because of the way internal combustion engines burn fuel incompletely, are a major contributor to air pollution in Alberta's cities. While the problem here is less than in several U.S. cities infamous for a near-constant brown blanket of smog, Alberta Environment's pollution contol division has nonetheless warned of "potential hazards" from certain pollutants in the air of Edmonton and Calgary.

In theory, combustion engines take in air and gasoline, ignite the mixture with a spark, burn the gasoline to carbon dioxide and water and use the energy produced to run the car. But cars, in actuality, convert fuel to mechanical energy with an efficiency of less than 40 per cent

Incomplete combustion due in part to a high fuel-air ratio (too little oxygen) produces the deadly carbon monoxide. Unburned gasoline appears in the exhaust as hydrocarbons. High temperatures within the engine cause oxygen to unite chemically with nitrogen in the air, resulting in nitric oxide and nitrogen dioxide.

Lead compounds, added to fuel to improve the octane rating, are not burned and are released unchanged into the atmosphere.

Smog results from a chemical reaction between hydrocarbons, nitrogen dioxide and sunlight, and is the most visible evidence of air pollution. The pollutant ozone is a major component of photochemical smog.

Environment Canada says the noxious chemicals emitted from the tailpipes of gasoline-powered vehicles in Canada during a recent year exceeded 11 million tons, making up almost 60 per cent of the total airborne pollutants released from all sources!

In Edmonton, the 1975 annual report of the pollution control division--the most recent report available--pinpointed both nitrogen dioxide and ozone levels as constituting a potential health hazard, while Calgary's 1975 report added carbon monoxide.

What are these mysterious-sounding pollutants, aside from chemical formulae described in a high school textbook? How do they affect people and the environment?

Carbon monoxide, or CO, is probably the pollutant best known to the public. It attaches itself to hemoglobin--the red pigment in blood cells which carries oxygen from the lungs to our tissues--reducing the ability of the blood to carry the normal quantity of oxygen.

Scientific literature suggests that there are no definite health hazards when less than three per cent of our hemoglobin is combined with CO. Between three and five per cent, people with heart disease can experience adverse effects, and levels above five per cent can result in severe motor impairment of healthy people.

Dr. Smith's Calgary study showed that smokers have higher CO levels generally than non-smokers, but smokers who work around traffic--such as taxi drivers, police constables and parkade employees--greatly increase their exposure, having CO levels averaging 7.2 per cent, 8.5 per cent and 10.5 per cent respectively.

The pollution control division's monitoring stations showed that of CO readings averaged on a 24-hour basis in Calgary for 1975, provincial air quality standards were exceeded 6.3 per cent of the time downtown, six per cent of the time in the test residential area and four per cent of the time in the industrial district's station.

In comparison, Edmonton's 1975 CO readings in excess of standards were 1.5 per cent downtown, 3.2 per cent residential and .2 per cent industrial.

Almost all the CO in Calgary comes from motor vehicles, while the major source in Edmonton is industry, mainly the oil refineries east of the city. The last inventory of air pollutant emissions and sources for Calgary, conducted by Alberta Environment for 1973, showed that city with 135,000 tons of CO emitted, 82 per cent of which came from motor vehicles. Edmonton had more than 2 1/2 times as much CO, 379,000 tons, but only 38 per cent came from motor vehicles as opposed to 58 per cent from industries. (CO from industries, released through high stacks, would tend to be dispersed more quickly than CO released by tailpipes at ground level.)

While the CO levels in Edmonton have likely decreased since 1973 due to the refineries' installation of CO boilers, the city probably still has more CO emissions than Calgary. Why, then, is Calgary known as the city with one of the worst carbon monoxide levels in Canada?

The answer lies partly in Calgary's topography and meteorology. While Edmonton, except for the river valley, is relatively flat, Calgary--like Los Angeles--lies in a bowl-like formation that tends to stagnate air.

Also, Calgary has more chinooks and when warm air stays aloft over the city, inversions are created. Normally warm air at ground level moves up, dispersing pollutants, and cooler air from greater altitudes moves down to replace it. But during temperature inversions the pattern is reversed, and cool surface air is 'stuck' close to the earth, trapping the pollutants.

Of course carbon monoxide isn't the only pollutant affected this way. Another one--mentioned as a potential hazard for both major cities--is nitrogen dioxide, the most toxic of the oxides of nitrogen, which has

ENVIRONMENT VIEWS

Student's guide: Automobiles and the Environment

Prepared by Dan Stoker
Environmental Education Co-ordinator
Alberta Environment

The following questions relate to the articles in Environment Views, Volume 1, No. 5 on Automobiles and the Environment.

Introduction: **Mobility at a Price**

1. Early in the introduction, seven items were referred to as "the broader costs incurred by the environment." Reorder the seven in a list, putting what you consider to be the most serious problem first and the least serious last. Explain why you made the first and last selections as you did.
2. Many Canadians currently depend on the continued use of the individual automobile for their livelihood. In the ninth paragraph of the introduction seven occupations are mentioned. Add seven or more occupations to this list.
3. Prepare a pie graph, eight centimetres in diameter, to illustrate the proportions by weight of the various materials used to make up the 1,431 kg weight of a 1978 Malibu.
4. The following short questions review some of the facts presented in the introduction.
   - i) What percentage of the automobile scrap generated each year in Alberta ends up being reprocessed?
   - ii) What are some of the things referred to as "gook" that appear in highway run-off?
   - iii) Approximately what percentage of a city's inhabited land area is consumed by the car's requirements?
   - iv) What are the two major byproducts released into the atmosphere as a result of the combustion of gasoline in a car engine?
   - v) What statistic is given for the annual consumption of gasoline in Canada?

The Automobile and Urban Land Use

1. Why is Calgary considered unique among Canadian cities with regard to automobiles?
2. One quote in this article was: "Why have jobs on one side of the city and homes on the other?"
   - i) What argument(s) might be given to support the separation of homes and work places?
   - ii) What argument(s) might be given in support of having people located closer to their work areas?
3. Alderman Husband offers at least three suggestions to remedy some of the problems concerning city transportation. Paraphrase each in a sentence.
4. To get an idea of the importance of cars as modifiers of our local communities, here's a suggested mapping activity. Select a block or two along a local main road in your community for the purpose of a survey. On a plain white piece of paper, draw two lines about three centimetres apart down the centre of the page from top to bottom. Now assume that the lines represent the borders of a street. Draw in, along the street, all the features that exist for the car's sake, i.e. parking stalls and lots, service stations, traffic signs and lights, parking meters.

The Four Wheel Drive Free-For-All

1. What legislation exists to control four-wheel-drive vehicle use in the wilderness country?
2. In which ways do 4x4 vehicles present a greater threat than motorbikes?
3. The 4x4 clubs are presented in this article as groups of people interested in sticking to conservation rules. What sort of a person, in what type of a situation, must one then assume is the source of the problem, if it exists?

Toll of the Tailpipe

1. What follows are some questions on facts presented in this article:
   - i) At what efficiency do cars convert gasoline to mechanical energy?
   - ii) What feature of the engine environment causes the formation of nitrogen oxides?
   - iii) What three factors need to be present to form photochemical smog?
2. Why is so much more carbon monoxide emitted in Edmonton than in Calgary?
3. What environmental features in Calgary have caused it to be one of the worst cities in Canada for carbon monoxide levels? Explain how these features work to cause the problem.
4. How does the cold contribute to the air pollution problems in Alberta?
5. List the actions under the label "proper maintenance" which will help decrease auto emissions.
6. In the table that follows, the percentage contribution of pollutants contributed by Calgary's (gasoline-powered) motor vehicles has been left for you to compute. In each case, the percentage contribution from the various sources adds to 100.00 per cent.

Relative Contributions from Different Sources for Three Major Air Pollutants in Calgary, 1973

SOURCE	CARBON MONOXIDE	OXIDES OF NITROGEN	HYDROCARBONS
Motor vehicles (gasoline)	?	?	?
Motor vehicles (diesel)	1.8	27.0	1.9
Industry	0.1	17.8	13.0
Aircraft	0.4	0.4	0.8
Natural Gas Combustion	0.3	17.1	3.1
Locomotives	0.1	1.0	0.5
	100.0	100.0	100.0

7. If the 1973 total for oxides of nitrogen emitted by locomotives in Calgary amounted to approximately 123 tonnes, how many tonnes of oxides of nitrogen were produced from all sources combined?
Suggestion: For more information on air pollution emissions in Edmonton or Calgary write to Alberta Environment, Communications Branch, 14th Floor, 9820 106 St., Edmonton T5K 2J6 and request either ***Inventory of Air Pollution Sources and Emissions in the City of Calgary, 1971*** *or* ***Inventory of Air Pollution Sources and Emissions in the City of Edmonton, 1971.***

"Those Darn Emission Control Devices"

1. In a sentence or two explain why you might, under certain circumstances, be able to support the idea of having regulations making it illegal to tamper with pollution control devices.
2. In a sentence or two explain why, under certain conditions, you might not support the regulations described above.
3. In your own words, and preferably with a simplified diagram, describe any two of the six devices explained in the article.
4. What advantages to using lead-free gas are claimed in the article?

The Customizing Craze

1. A number of possible explanations are provided in this article to answer the question of why people customize their vehicles. In a paragraph or two explain what you think is (are) the reason(s) behind customizing.

Obsolescence and the Car Industry

1. In your own words, write a sentence to explain the meaning of:
   i) obsolescence of quality,
   ii) obsolescence of function,
   iii) obsolescence of desirability.
2. How are cars compared to women's fashions?
3. How have a) the greater variety of models; and b) certain types of car design; added to the cost of maintaining vehicles, according to the sources quoted?
4. According to the August 1978 issue of *Canadian Consumer* (a magazine possibly obtained in your library), "it's not at all unusual for an exhaust system to fail in the first six months of use." In their words, it's "a guaranteed pain in your car's rear end."
Consider that, at $25 per car per year, a conservative annual estimate of the cost of maintaining Canadian cars' exhaust systems is $225 million. And consider that, in 1975, 89 people died in automobile-related carbon monoxide poisonings. Finally, consider that some traffic consultants believe carbon monoxide leaking into a car from a faulty, rusted system may account for a great many auto accidents. It would appear that obsolescence of quality in mufflers is a serious concern.
In a few sentences for each, describe how the following relate to the muffler problem:
   i) Canada's climate--the winters
   ii) Wasted resources
   iii) Employment and small business opportunities
   iv) Your health
5. Herb Grey, a former Member of Parliament and Minister of Consumer and Corporate Affairs, has been quoted as saying "our motor vehicle laws are inadequate. We should definitely be closer to American law. As it stands here, manufacturers simply have to tell the owner of a car that there is a defect and what should be done to fix it. The manufacturer is under no obligation in law to recall a vehicle or to fix it."
Do you agree that the situation is inadequate? Give at least two reasons to support your position either way.

The Recycling Role of Auto Wreckers

1. Which parts of a car tend to be the most durable and therefore of most value to auto wreckers?
2. In a paragraph or two describe whether or not you feel auto wrecking operations are, generally speaking, an asset to society.

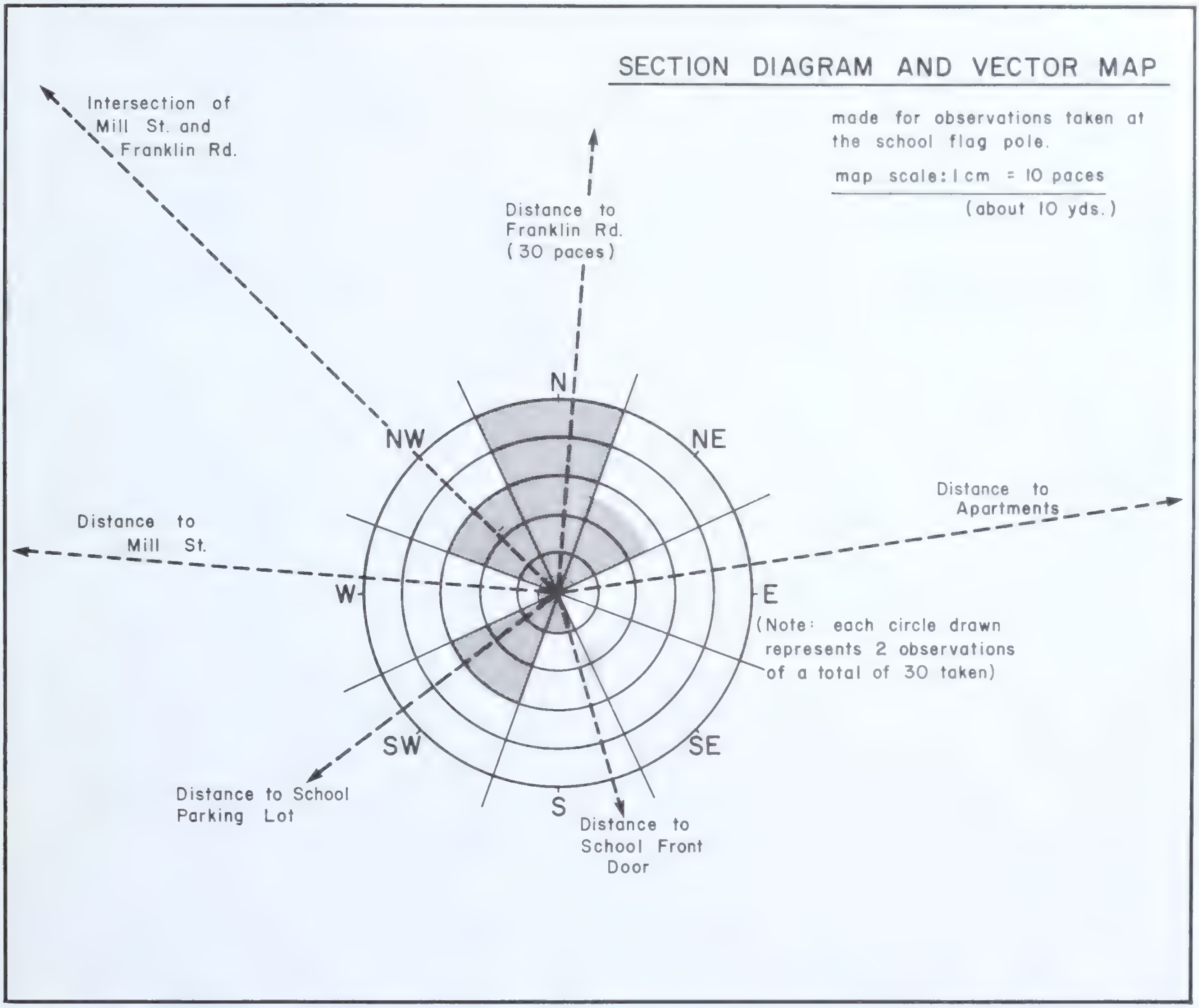
Alternatives to the "One-Person, One-Car" Syndrome

1. Is it fair to cast the car as a 'villain'? Make two lists, one to identify the advantages to individuals of owning their own cars, and the other to identify the disadvantages.
2. How does Lawrence argue a need for bus lanes in cities?
3. What are some of the arguments for and against having no-fare service on buses, under which operational costs are paid entirely through taxes? Give at least two arguments for, and two against. You might consider things such as the effects on the use of buses, the number of traffic tie-ups, the cost, the need for bigger and better roads, etc.
4. Why does Lawrence maintain that "transportation and communication (should be) viewed as one concept?"
5. Give three examples of changes currently taking place to support the view that, in fact, automobiles are evolving.

A Field Study on Transportation and Other Noise Sources

What follows is an outdoor experiment that can be performed by students with a minimum of equipment and supervision.

General description of experimental design
Two students working at a particular study site in the schoolyard (or at a neighboring park, shopping centre, apartment building, etc.) note the compass direction from which the loudest sounds are heard at timed intervals. Twenty-five, 30 or more observations are taken at the site, directions are recorded and later graphically displayed, preferably on a vector map which shows the distances to major features around the site. A hypothetical *vector map* and *sector sound diagram* are shown below.


SECTION DIAGRAM AND VECTOR MAP
made for observations taken at the school flag pole.
map scale: 1 cm = 10 paces
(about 10 yds.)
Intersection of Mill St. and Franklin Rd.
Distance to Franklin Rd. (30 paces)
N
NE
NW
Distance to Apartments
Distance to Mill St.
W
E
(Note: each circle drawn represents 2 observations of a total of 30 taken)
SW
SE
S
Distance to School Parking Lot
Distance to School Front Door

Materials required

1. A compass (or a circular piece of paper divided into eight sectors of the compass--N, NE, E, SE, S, SW, W, and NW).
2. A watch with a second hand (or stopwatch).
3. Pencil, data record sheet, and clipboard.
4. A blindfold, a tape-measure (optional).

General account of method

Two students establish themselves at the study site, one blindfolded and functioning as the listener, the other acting as the timer and recorder. The recorder places the compass on the ground near the listener with north oriented to north (similarly with the circular paper, preferably weighted down by a stone to prevent it from moving).

The recorder waits for the second hand on his or her watch to reach 12, 3, 6, or 9 and softly says "now." The listener points in the direction of the loudest sound heard in the next few seconds, or the source of the first audible sound. The recorder notes on his or her data sheet the direction in one of the eight possible sectors (N, SW, etc.). As soon as the recorder has finished recording the direction, the process is repeated. Note that it is not necessary that each recording be 15 seconds apart, for the recorder may be still recording the previous data when the second hand is passing the next 12, 3, 6 or 9. Repeat 25, 30 or more times for the site. The time that the data was recorded, possibly along with weather conditions (winds) should also be recorded. Next pace off the distances from the site to major features in the neighboring vicinity. Note the distance and direction of each major feature considered.

The experimenters have a number of courses of action at this point:

i) repeat the experiment changing duties,
ii) repeat the experiment at a different time,
iii) place a sound barrier near them and repeat the experiment,
iv) repeat the experiment at other positions closer and/or farther from the major noise sources.

Follow-up

1. Prepare a Sector Sound Diagram for the site.
2. Prepare a Vector Map for the site.
3. Summarize in a paragraph the nature and origin of sounds affecting the site.
4. Describe in a few sentences how noise levels at the site might be reduced.

MARK VITARIS

been correlated elsewhere with increased respiratory disease.

According to the 1975 annual reports, motor vehicle emissions account for about half the oxides of nitrogen in Edmonton, and more than half in Calgary, with other sources being home heating and electric power generation.

Nitrogen dioxide readings averaged on a 24-hour basis in downtown Edmonton showed 0.87 per cent in excess of air quality standards in 1975. Calgary's levels, as measured by the pollution control division's monitoring stations, exceeded the standard 0.6 per cent of the time residentially and 9.7 per cent of the time industrially.

The last monitored pollutant of those identified as "of greatest concern" in Edmonton and Calgary was ozone, one of the substances produced when hydrocarbons react with nitrogen oxides in the presence of sunlight.

According to the pollution control division, even at low levels ozone affects sensitive vegetation--some varieties of spinach, oats, beans, potatoes and tomatoes--and materials like natural rubber, which it cracks. In people, ozone can irritate the mucous membranes, especially the nose and throat, and affect individuals with asthmatic conditions.

Of the 24-hour ozone readings taken in Edmonton, nearly 75 per cent in both downtown and residential test areas exceeded the provincial standards, as well as 44 per cent in industrial Edmonton. Calgary's excessive readings were 46 per cent downtown, 89 per cent residential and 69 per cent industrial.

The meteorological and topographical features that predispose a city like Calgary to air pollution are shared by some of its U.S. counterparts. But Canadian cities, unlike many of the southern centres, experience another factor equally frustrating in the battle against pollution: the cold.

When a vehicle's engine is cold, it works even less efficiently than normal, burning more fuel incompletely and producing higher levels of CO and hydrocarbons. The more intense the cold, the longer it takes a car to warm up, and the more emissions are increased.

Using a block heater, which keeps the engine warm and decreases or eliminates idling time, helps to minimize this problem although it uses up electrical energy, the production of which can also contribute to air pollution problems.

What else can be done to minimize air pollution from motor vehicles? Proper vehicle maintenance can decrease the amount of gasoline consumed and substantially cut down on exhaust emissions.

During a recent one-year emission testing program, sponsored by Alberta Environment and the Alberta Motor Association, more than 37 per cent of 10,528 vehicles tested in 34 communities recorded excessive CO concentrations, while 3.8 per cent had excessive hydrocarbon concentrations, both of which could probably be significantly decreased by proper maintenance.

Proper maintenance includes periodic tuning of a car's engine, wheel alignment to prevent a gasoline-wasting drag of tires, keeping tires inflated to recommended pressures to prevent extra tire friction, and lubricating engine parts so they too work smoothly.

The pollution control devices explained in the next article can substantially cut emissions if they too are maintained. But there are no laws to force their maintenance, or even their continued use.

The federal government imposes legal limits for emissions on the manufacturers of new cars, but once a car is sold and leaves the dealer's showroom, neither Ottawa nor the province extend the legal obligation onto the owner.

So it's up to the individual vehicle owner. He can also help lessen automotive air pollution by good driving habits: avoiding 'jack rabbit' starts, high speeds, excessive idling and accelerator pumping. ■

Dan Stoker

"Those Darn Emission Control Devices"

... for those as interested in top quality air as in top quality performance.

André Lorent works at Auto Performance, one of a number of Calgary businesses that makes its profits on restoring 'zip' and 'pow' to automobiles.

He dismisses the modern anti-pollution engine as a fuel waster that has no 'power.' If he had "a stock of 1970 or '71 engines, they would be sold out tomorrow," he says.

At JB Automotive in Red Deer, a similar service is offered to customers for a 'crisper' engine, according to mechanic Randy Dyck. How do they deal with the anti-pollution gadgets, the stuff that Randy says "just hangs on" to new car engines?

"We have garbage tins full of those things," he claims.

'Zip' and 'pow' can be purchased in Edmonton as well. Jim Vanderzee at Pacemaker Automotive estimates it costs $50 to $100 to have the $200 to $300 of anti-pollution equipment removed for their customers.

You might think that messing around with pollution control equipment would be illegal. It isn't. The 1971 Clean Air Act for Alberta makes provisions for setting regulations regarding the removal or 'rendering ineffective' of pollution-control devices, but such regulations have never been established. (The Federal Government prohibits car retailers from removing devices prior to sale of the car.)

So if performance is your game, it would appear that the hundreds of millions of dollars of engineering, testing and redesign spent by the auto industry to meet the stiffer emission standards of the day have resulted in little more than a pile of junk.

But what about the average car owner? What about the vehicle operator who is less concerned about burning rubber on hot concrete and more concerned about fuel economy, winter starting and good day-to-day, problem-free driving?

Well, it was generally this segment of the population that showed up in droves at a recent exhaust testing program in Edmonton and Calgary, where automotive 'breath testing' almost turned into a local craze and technicians worked into the evening hours to avoid disappointing those at the end of the line.

There was no problem finding time to talk with those who'd come. Most waited in line for well over an hour to be hooked up to the mobile lab for analysis and carburetor adjustment.

For many, their prime interest was "just to see that my car is in good running order." For them, good gas mileage and a well-tuned engine went hand in hand.

Many others endured the long wait primarily to make sure they weren't adding to the air pollution problems of the city. Comments ranged from, "I guess I'm a concerned citizen" to "I don't want it on my conscience."

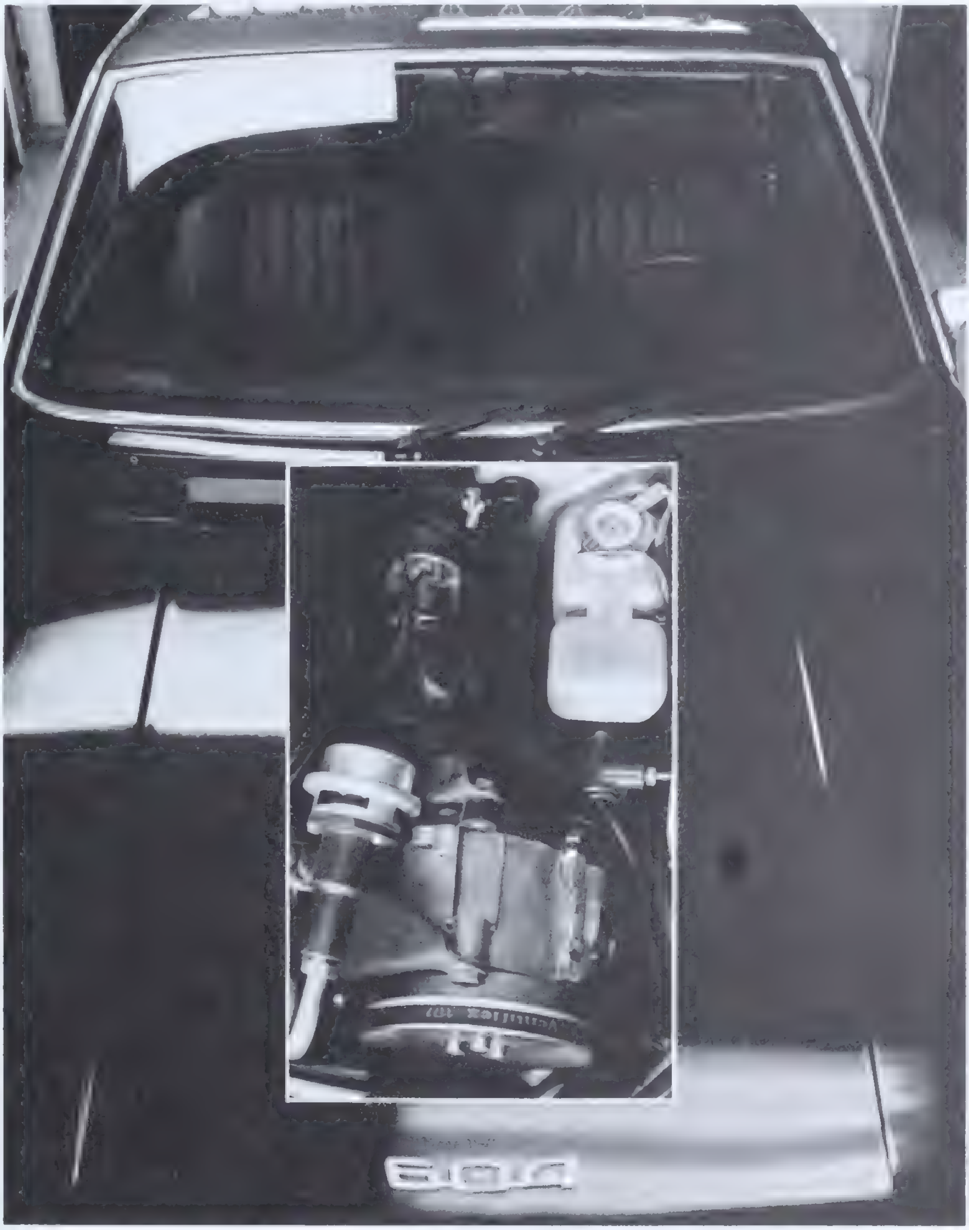
The rest might be categorized as just plain curious. Curious to see how their cars stacked up with the rest.

Duane Schommer, for instance, was curious to see how his late model Lincoln, which he had admittedly purchased "from a guy who had changed it a lot," would come through the test. It failed. But of all the people interviewed in the exhaust testing line up, one fact was clear. The average driver has little or no understanding about pollution control devices on his car. He is, in fact, stymied by most of the workings of his vehicle and, when faced with a cough, gasp or wheeze beneath the hood, is rather quick to point a finger at 'all those darn pollution devices.'

So it's time we all rolled up our mental sleeves to fine-tune our knowledge about emission-control systems on cars. Gear down for some garage talk.

Thermostatic air cleaners are now commonplace on most cars. They involve a valve device on the air cleaner which selectively draws warm air from around the engine block when the car is first started. Warm air, not cold air, then enters the carburetor and vaporizes the fuel mixture for more complete

Great car. Wow! Like the latest emission control devices? SEE YOU!



LAURENDALE

An exhaust emission system with pump and anti-backfire valve.

combustion. The result: less pollutants, better fuel mileage and less stalling.

Positive crankcase ventilation (PCV) systems were among the first pollution-control systems installed in automobiles. Simply stated, the fumes created in the crankcase (the bowels of the engine) are drawn back into the carburetor and then into the piston chamber where the gasoline vapor is ignited. The fumes are therefore burned with the gasoline, and are reduced largely to harmless byproducts such as water and carbon dioxide.

Evaporative emission control systems prevent loss of gasoline fumes from the carburetor. A charcoal canister offers a storage system for the gasoline fumes when the engine is off and a valve system offers a mechanism for recycling the fumes when the engine is started again.

Air pumps are special devices that inject air into the exhaust manifold which receives the exhaust gases immediately following combustion in the engine cylinders. With the injection of air at this point, fuel and gases from incomplete combustion are further burned and reduced to harmless byproducts. For a couple of extra horsepower, the belt-driven air pump and air-injection manifolds are prime targets for removal by hot-rodders who are more interested in top performance than top quality air.

Exhaust gas recirculation involves the metering of small amounts of exhaust gas back into the intake manifold. The exhaust gas recirculation is designed to reduce peak combustion temperatures which result in the production of one of the major auto pollutants, namely oxides of nitrogen.

Catalytic converters are better known to motorists because they brought in an era of lead-free gas. The converter is a muffler-like chamber in the exhaust system that contains substances (called catalysts) that cause hydrocarbon and carbon monoxide pollutants to be changed to harmless substances. Platinum and paladium-coated, porous metal pellets have been used in the General Motors type of converter. It is estimated in the 260-cubic-inch displacement model–one of GM's biggest--that the catalytic surface is equal to the area of 59 football fields. It is at this surface that the pollutants are converted.

If leaded gas is used with a catalytic converter, deposits form on the catalytic surface rendering the converter ineffective. The system can survive a few mistakes, but repeated errors cause a clogging of the converter, subsequent engine performance problems and lower gas mileage.

Despite the claims of many displeased motorists who vent their frustration on pollution-control devices and end up removing them, auto manufacturers claim that there may be a small gain in fuel mileage attributable to properly-functioning converters. Lead-free gas has certainly proven its value in giving longer spark-plug life, reduced carburetor and ignition-system maintenance, and a generally reduced engine deterioration rate.

But there is a price to be paid for "add-ons" like converters. An elaborate heat-shielding system has had to be installed to prevent heat build-up in the car's interior. The catalyst has to be very hot to work well. And while carbon monoxide and hydrocarbon pollutants are reduced, the catalytic converters have been found to produce various sulphur pollutants, including sulphuric-acid mist, as byproducts. As many city drivers will attest, converter-equipped cars idling at a traffic light can give off quite an odor.

So perhaps the enigma of pollution-control systems in cars is now just a little less mysterious. Perhaps you will be willing to role up your real sleeves and take time with your car this weekend to probe its inner workings. Dust off the owner's manual and get acquainted with your engine. If it is well-tuned and properly serviced, it is probably as clean as it is going to be.

Dan Stoker is Alberta Environment's Environment Education Co-ordinator.

Jack Spearman

The Customizing Craze

LAURENDALE

It's not pleasant out there on our streets and highways. They're noisy, smelly with exhaust, clogged with frustrating traffic pileups and dotted with nuts doing twice the speed limit dodging in and out of lanes.

Still, most Albertans are clearly not about to turn in their car keys for transit passes. So perhaps it's no wonder they're spending millions of dollars transforming the environment on the *insides* of their vehicles into wonderlands on wheels.

Don't want to hear the motorcycles and cement trucks roaring by? Spend a thousand dollars and a motorist can have installed a tape deck that will rattle windows a block away.

While he waits for the traffic ahead to thin out, he can open the glove compartment and take out the percolator that plugs into the cigarette lighter. He can sit back while the odor of brewing Java fills the interior, then sip the coffee from a no-spill commuter cup that sits nicely on the fold-down food tray.

He can slump cozily in January on imported sheepskin seat-covers or even recline on his van's round waterbed below a crystal chandelier.

A myriad of options can transform a van into virtually anything. And customized vehicles are no longer the preserve of youngbloods hoping to impress the girls on a Saturday night.

Middle-class and middle-aged Albertans are also spending heavily on vehicles these days, and it's obvious they want much more than four wheels and a motor. Car dealerships report the big V-8s are moving rapidly and, despite rising gas prices, motor homes and travel trailers are an increasingly common sight along side of suburban garages.

Albertans are spending millions to transform their vehicles into wonderlands on wheels

Like the clothes we wear, food and liquor we consume and the furniture we buy, cars are just another extension of what we are, or hope to be.

"I drive a Volkswagon bus," says Ted Kelly, a freelance automotive columnist in Calgary. "It's nothing really, just a big box on wheels."

He said he knows it's silly, but he has had a chrome exhaust pipe installed that gives the feeble-four over the back wheels the throat of an eight-cylinder engine.

"What can I say? I know it doesn't do anything to make the car go faster or more efficient, but I just like it," he shrugged.

Van owner Carl Phipps of Calgary has invested close to $14,000 in customizing his machine during the past year. He buys van magazines and ogles the units he sees on city streets. Asking him about his vehicle is akin to asking a grandparent to show off pictures of his grandchildren.

"The first thing I got were the chairs. I had to feel good at the wheel, so the ones I got swivel, have five inches of padding and are more comfortable than my sofa at home," he smiled.

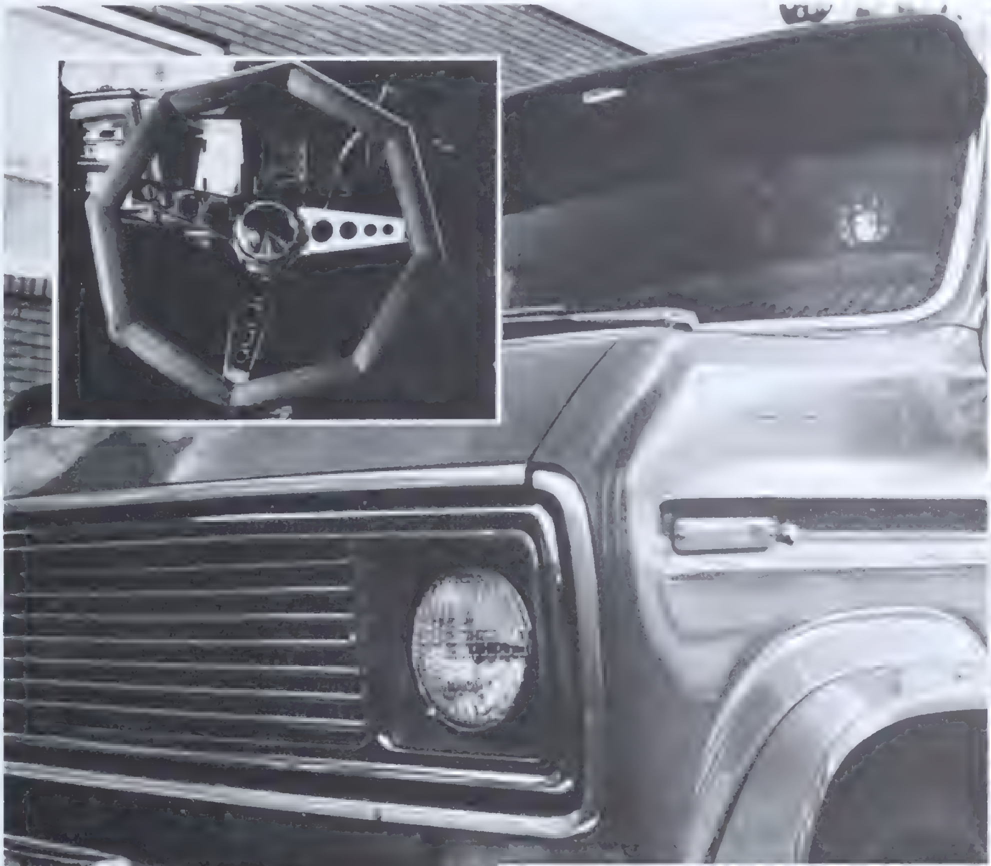
After that, he fitted his van with a CB radio, a $600 stereo system, $300 worth of tinted glass and $100 worth of plush material for the ceilings and door panels in the cab.

Then the major job started: converting the big tin box on the back into a veritable bachelor pad on wheels.

"I've got the bar and TV in; the shag on the floor; the walls in plush fabric to match the chairs and the bed in the back . . . I did some of the work myself and when I'm not driving or looking at it I don't want to think what it's cost."

The environment inside a customized vehicle can become so relaxing that it's difficult to leave. Then a driver can just dine at a drive-in restaurant, bank at the drive-in teller, pick up laundry at the drive-in cleaners and take in a movie at the drive-in theatre.

Want a vacation with all the comforts of home? With a motor home, Dad can slip



from the living room's easy chair into the swivel chair behind the wheel, and Mom can have a panelled kitchen with a stove and refrigerator.

Businessman Paul O'Malley bought a motor home two years ago for more than his house cost him 23 years back.

"I look at it this way," he explains. "It's expensive but I want it. I've worked hard all my life and it's something I think I deserve.

"I love my motor home . . . I can just pack up and go. No worries about where to stay or what to eat." He said he gets about 14 miles (23 kilometres) to the gallon on flat stretches and about nine (15 kilometres) on a trip to the mountains.

Bill Odenbach manages the string of JB Automotive shops in Calgary and says his customers go through cycles.

"I can tell pretty well what they'll want when they walk through the door, just by age," he said. Under 25, drivers want flashiness, speed and performance. Between 25 and 40, they want economy and reliability and, in later years, motorists usually have enough money to demand performance with comfort and convenience.

Whatever a motorist wants in his car, there's probably a shop that can provide it. For those who don't like the array of exterior colors offered by Detroit, there are paint shops with spray guns and brushes to put on any hue--or an original painting--under a dozen applications of lacquer.

For those who drive Volkswagons but want to look like millionaires, a Rolls Royce hood kit can be installed, or a custom fiberglass body designed.

There's really no explaining why motorists are willing to spend so much money to be different driving from 'point a' to 'point b.' Maybe it's a reaction to the days when Henry Ford said his customers could buy a Tin Lizzy in any color, as long as it was black. Or a reaction to the era when Albertans lived a less affluent lifestyle and a car, any car, was considered a luxury.

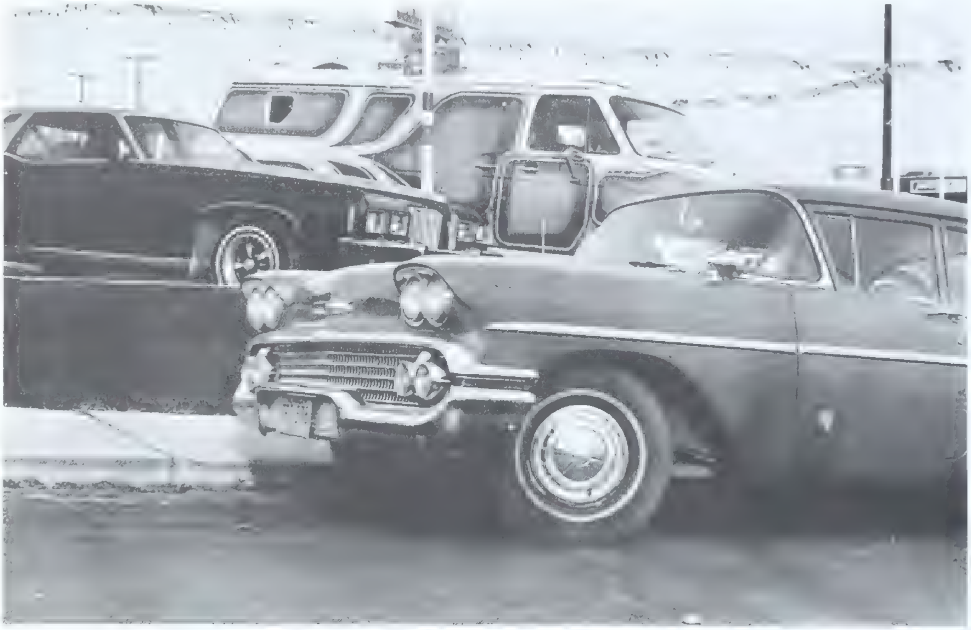
Then again, considering the outside driving environment the average motorist faces daily, maybe the theory about compensating on the inside of the vehicle--making that environment as comfortable and carefree as possible--is as good as any.

Jack Spearman is a journalist in Calgary.

Starr Smith

Obsolescence and the Car Industry

Feeling "out of it" with an older car



MARK VITARIS

LATEST MODEL ✡
Real Steering Wheel
BILL OF SALE
Ah, yes. Well. Now if you had bought the latest model you wouldn't have that problem

The car is the fifth largest item on which Canadians spend their income, after food, housing, clothing and furniture. Combine this with the trend towards a "disposable" society and the problems are obvious.

Cars are built to last only about five years without major repairs, according to Phil Edmonston, president of the Automotive Protection Association, in his *Canadian Used Car Guide*. The average car, which uses about a tonne and a half of non-renewable materials in its body--not counting the energy it takes to produce it--has an average life of 10 to 12 years (125,000 to 150,000 miles, or 200,000 to 240,000 kilometres).

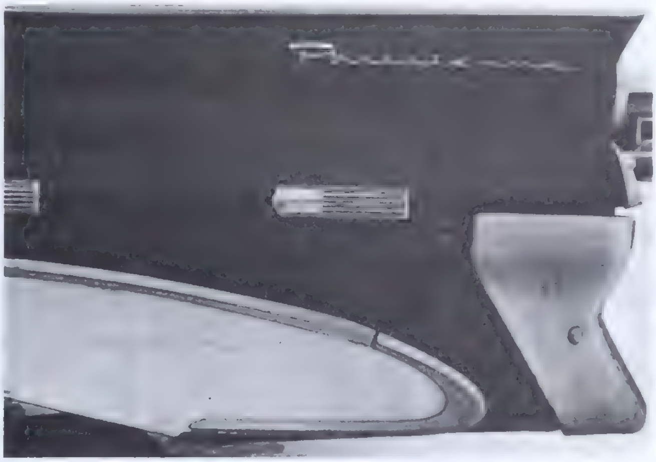
Why can't vehicles be built to last longer? Why does obsolescence appear to be built right into them, along with the power brakes and retractable headlights?

A public relations spokesman for General Motors in Oshawa, Ont., said it would be prohibitively expensive to build a car to last twice as long. He said they could build cars out of "stainless steel or gold" but no one could afford them.

Vance Packard in *The Waste Makers* has a different explanation. He said independent research indicates that the real reason for obsolescence in automobiles relates to the profitability of the industry which builds cars and provides replacement parts. One person in six works at a job directly related to automobiles. If fewer cars were constructed and they were more infrequently serviced, industry profits would decline and this vast work force would be affected.

According to Packard, planned obsolescence is a strategy used to influence either the shape of a product or the mental attitude of the consumer. In modern marketing practice, the obsolescence pattern falls into three categories.

Obsolescence of function occurs when an existing product becomes outmoded because a new product performs a function better. Obsolescence of quality means that a product wears out in a given time--usually a relatively short time. Obsolescence of desirability is in the consumer's mind. It means



LAUREN DALE

that although a product is still current in terms of function and quality, it appears less desirable than a new product because of the latter's style or some other change.

The car industry, Packard states, was the first major group to become fascinated with the increased sales that might be achieved by imitating the women's fashion stylists. By using obsolescence of desirability, the public could be made to feel "out of it" if they didn't buy new cars every one to three years.

Although generally a post World War II phenomenon, planned obsolescence took on real importance for the auto industry in the '50s. The emphasis was not only on new styling, but on design innovation as well. Technological breakthroughs such as balloon tires, shock absorbers and four wheel brakes were highlighted in advertisements. These new features started a trend which has pervaded ever since.

The Great American Auto Repair Robbery by Donald A. Randall and Arthur P. Glickman indicates that obsolescence of desirability is produced mainly by relatively minor changes in outer appearances, for a major overhaul in design is costly. These minor changes, in features such as front grills, lights and paint jobs, were undertaken yearly while major design changes were made about every three years.

The 1977 report of the federal government's automotive task force declined to discuss the concept of planned obsolescence. However, it did note that "because of the apparent near saturation of the automobile market in North America much of the current demand is replacement business and to stimulate sales the vehicle manufacturers have also had to develop a market strategy that induces owners to replace their present cars at frequent intervals with new ones.

"To stimulate this segment of demand the motor vehicle manufacturers have made a practice of introducing new models every few years with more modest changes in the intervening years. This strategy has been a major stimulus to the continuing growth of the automobile market in North America."

Packard's book suggested that obsolescence of desire was related to obsolescence of quality; that, indeed, obsolescence of quality was often a result of the mania for restyling.

Coupled with changes in styling was a growing multiplicity of models on the market, said Randall and Glickman. "In 1960 only 244 models were offered. By 1971 the number of models had risen to 375."

This greater variety created problems because few parts were interchangeable from one year to the next, or among the models of any one auto company in any given year, they said.

Furthermore, during the '60s many items that had been options became standard equipment, including two-speed windshield wipers, four-way emergency flashers and collapsible steering columns, said Randall and Glickman. The extra items were often added "with little regard for ease of repair, causing unnecessary costs and numerous headaches for mechanics."

Finally, some cars are designed in such a way that they incur or inflict unnecessary damage, said the two authors. Examples were bumpers mounted so close to the car's sheet metal that "when the bumpers crumple, so will the sheet metal," and sharp points, ridges and protrusions on hoods, rear ends and grills that "resemble military hardware like spears, swords, tomahawks and battering rams."

Edmonston's car guide noted that one of the most troublesome aspects of car wear is premature rusting. He even offered a number of diagrams showing where rust was likely to appear on different models of cars.

Although governments have addressed themselves in recent years to auto safety, pollution controls and reduced fuel consumption, they are only beginning to look at the life span of vehicles and the environmental problems arising from their mass use and disposal.

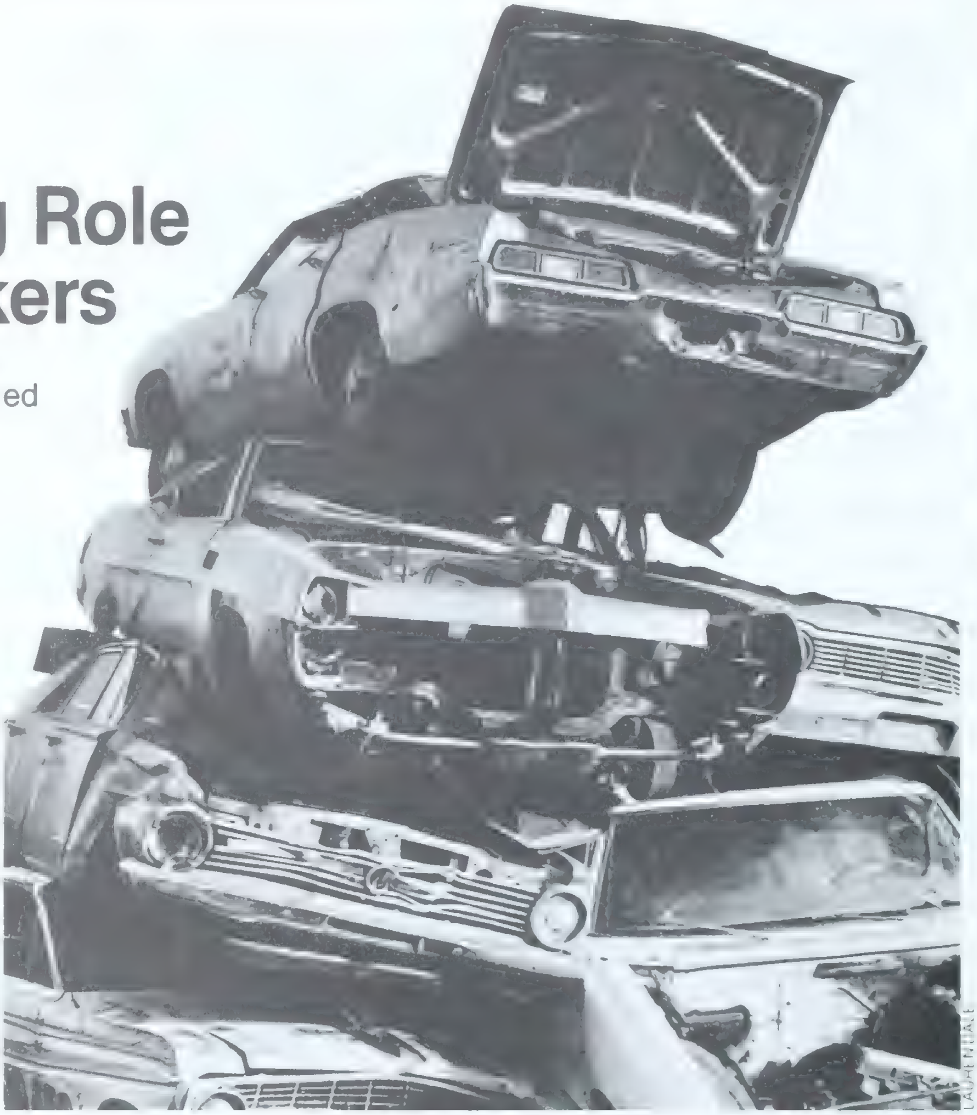
At present it is up to the consumer to stop the cycle of unnecessary waste. It's a lot to ask that ordinary people resist the tremendous power of advertising campaigns. But perhaps, ultimately, there will be no choices left. The depletion of natural resources will have made them for us.

Starr Smith is a freelance writer living in Edmonton.

Mike Harrop

The Recycling Role of Auto Wreckers

The power trains of most vehicles last longer than their wreck-mangled or rust-eaten bodies



LAURENT ITALE

Each year, more motor vehicles appear on Alberta highways; the number will increase to 1.34 million in 1978.

Most of the vehicles have a similar life story.

They arrive as lustrous, treasured possessions complete with bank loans, shiny chrome and a special new-car smell.

Around the time that the payments end the first dents begin to appear and rust starts to eat its way through fenders and door panels.

Some cars are smashed beyond repair in collisions.

Others become eyesores, and as repairs increase in frequency they become expensive to maintain.

That's where the 20 employees of Jasper Auto Parts in St. Albert and workers at hundreds of similar businesses come into the picture.

Auto wrecking is all that keeps Alberta from becoming choked with abandoned cars, maintains Steve Pacholok, manager of Jasper Auto Parts.

Because the power trains of most cars and trucks last far longer than the wreck-mangled or rust-eaten bodies, otherwise worthless cars are a rich resource that can be recycled, he said.

At the firm's yard on the St. Albert Trail north of Edmonton, the cars are stripped of their engines, transmissions and differentials. The newly-removed components are taken to a workshop where they are repaired or broken down into usable parts.

The bodies are stored elsewhere while such parts as tires, steering wheels and heater motors are removed.

Finally stripped, the bodies are loaded into a huge crusher which compacts the vehicles into bales for shipping to steel mills.

There, the metal is shredded and fed into furnaces which melt and purify it. Later, it is made into products such as girders and new automobile parts.

Most of the customers who turn up at wrecking yards are youths who hope to make their cars faster by installing a larger motor. Others include mechanics looking for hard-to-find parts and backyard mechanics who simply want to repair their cars at a minimum cost.

Prices for reconditioned used parts and components are about half those of new ones, Pacholok said. For example, a used Ford transmission that would sell for $600 new might be purchased for about $250.

Most drive-train parts last for 100,000 or more miles (165,000 kilometres), but few cars get beyond 65,000 miles (107,000 kilometres) because of accidents or rust generated by salt on highways.

More mechanics should install used parts, but few are willing to get their hands dirty on them, Pacholok said.

Many cars are completely ruined and sent to compacters early because their owners don't take adequate care of them, he observed, claiming that nearly half of a typical car's life is wasted because people don't change oil or make repairs early.

Many auto wreckers find themselves the target of controversy despite their important role, he said.

Although originally located on the edge of towns, urban growth dictates that auto wreckers will eventually find themselves in the same neighborhood as housing developments and businesses.

At St. Albert, a redevelopment scheme could force Pacholok's profitable business to either close or move.

In Lethbridge, the city was forced to take over the site of an automobile wrecking yard which was actually downtown.

Located on a coulee rim overlooking the river, scattered auto hulks and parts formed an unappealing backdrop to the Molsen Brewery Gardens, which a beer manufacturer maintained as a public attraction.

When the construction of a huge shopping centre was planned and a motel contemplated, it became obvious the auto yard had to go.

The firm has relocated east of town behind two-metre board fences that hide it from motorists whizzing past on a nearby highway.

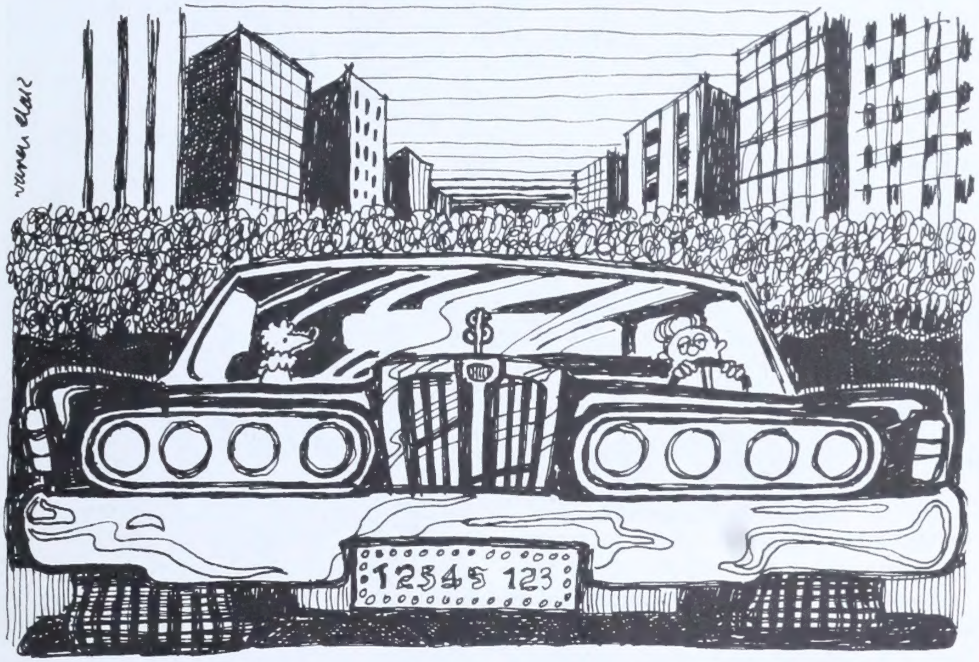
Such relocations often cut business by 50 per cent, because customers are as likely to look for competitors as for the new location of a recently-moved firm, Pacholok said.

Mike Harrop is a journalist living in Edmonton.

Donald McMann

Alternatives to the "One-Person, One-Car" Syndrome

If the standard passenger sedan is indeed becoming an anachronism, what could come along to replace it?



In Alberta as throughout Canada, we depend on our cars for transportation. They are private and convenient and comfortable. Our cities, with their square kilometres of low-density development, were designed with one fact in mind: Canadians are mobile; we can go anywhere in our cars.

But can we? As the 1980s approach, we are spending less time driving and more time sitting in traffic jams. Air is being fouled by exhaust fumes from thousands of powerful V8 engines propelling lone drivers at 15 kilometres an hour through crowded city streets. Tax bills rise as more acres of prime land are bought and paved. Worse yet is the news that one day in the future all our cars, those wonderful, liberating extensions of ourselves, may coast to a pathetic, impotent halt--out of gas, or at least reasonably-priced gas.

The standard passenger sedan is becoming an anachronism. It is expensive, wasteful and destructive. But without it, how do we get around? A number of possibilities exist. Mass transit is one. Another might be found in the evolution of the villain car, making it smaller, cleaner, and dependent on fuels from renewable sources.

We might also look to advances in communications, which would result in having to transport fewer people. Perhaps improved transportation and communication habits will develop from an amalgam of innovations.

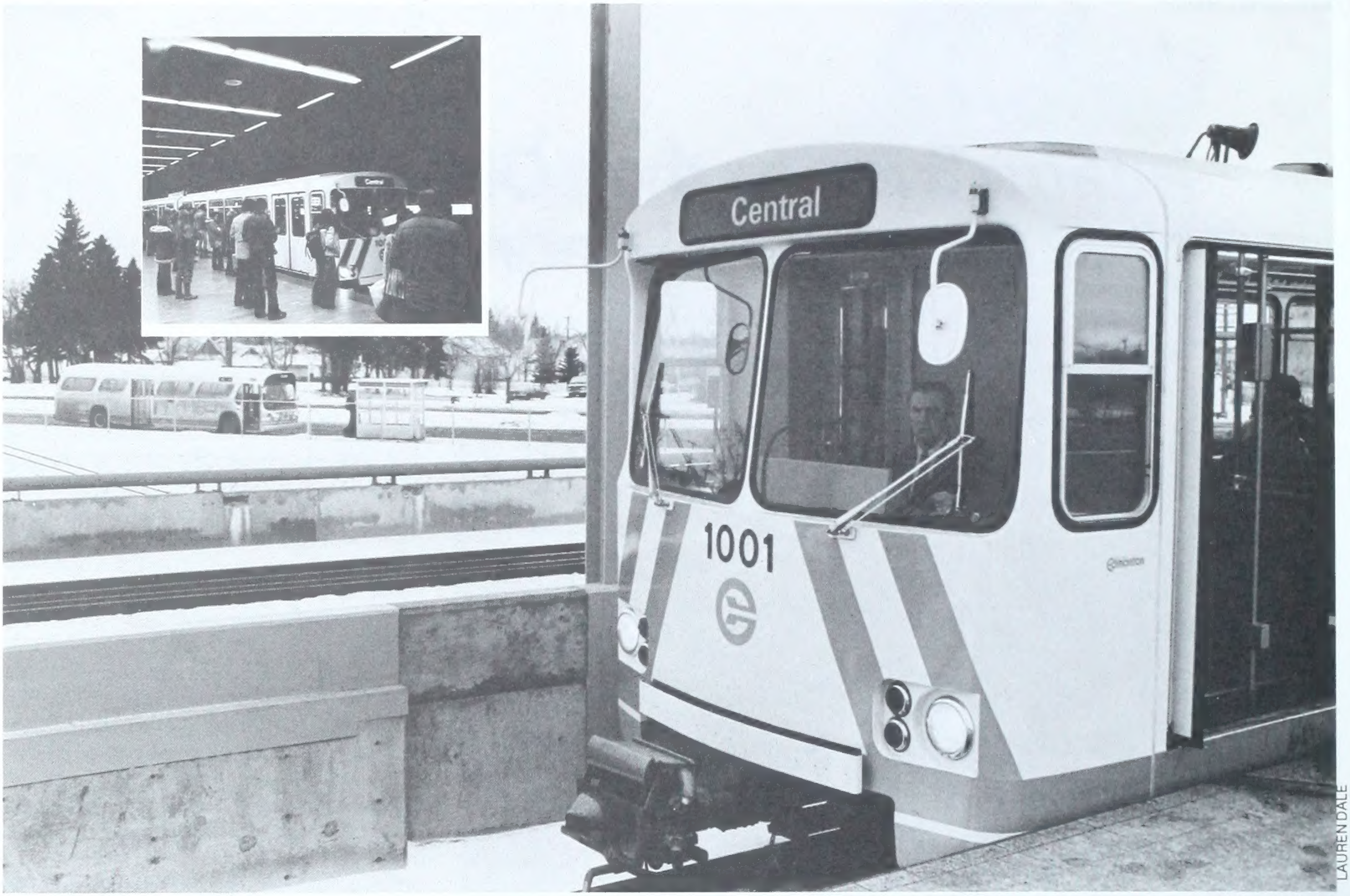
When people look for an alternative to the traditional private automobile, they usually think first of mass public transport. In Alberta this means buses and, most recently, light rail transport.

The Edmonton transit system, according to its director of marketing and development, L. A. Lawrence, is one of North America's most successful in that it moves an unusually high 25 per cent of the urban work force. Still more impressive is the fact that 30 per cent of the people travelling to the downtown area and 50 per cent of these going directly to the city's centre use the transit system. In addition, fully 50 per cent of all traffic to the university arrives by bus. This is obviously a good beginning, but can mass public transit attract still more users?

One thing which attracts people to mass transit is speed. An advantage of light rapid transit (LRT) such as that in Edmonton is that it does not have to compete with automobiles for right-of-way. Lawrence would like to see buses have increased priority. Buses in the city of Edmonton average only 16 kilometres per hour. In the heart of downtown, the best they can manage is six. A faster system would require fewer buses and would therefore be less expensive.

Lawrence advocates a plan whereby more lanes would be reserved for bus traffic only. "A bus with 60 or 70 people on it should have priority over a car with one person in it," he claims. But because drivers of cars far outnumber bus users, it is difficult to find support for the idea. This, despite the fact that the entire transit schedule can be thrown off by a single stalled car. When people are made late for work because of a missed connection, is it any wonder they return to their "dependable" cars?

Another problem that transit systems have in attracting passengers is that buses are relatively uncomfortable; many people just don't want to ride on them. Lawrence maintains that until recently bus transit has been run by people with a background either in operations or in maintenance. They have been concerned with the front of the bus, where the operator must be satisfied, and the back of the bus, where the mechanic works. "If anything happened between those two ends of the bus to satisfy the customer, it was purely by accident," he states. But Lawrence is convinced that "the customer-oriented attitude must prevail" if new users are to be won over from cars.



LAURENDALE

It may be that the real secret to a sucessful mass transit system is a comprehensive organizational scheme. Lawrence recently attended a course in urban transportation held in Pittsburgh, Penn. The course promoted a concept called "para-transit," a strategy in which all methods of transportation are organized. The routes of buses, trains, taxis--even private automobiles--are coordinated. Car pooling, for example, is centralized and computerized. A telephone call could tell you who in your area would be able and willing to give you a ride to your destination. This kind of organization could significantly reduce the number of cars carrying only one person.

Mass public transport may help to reduce automobile traffic in Alberta's cities, but experience has shown it to be a costly remedy. Transit department deficits regularly run to many millions of dollars. Whether or not this fact bothers you depends upon your philosophical attitude about mass transit.

Vic Hamm, of Alberta Transportation's urban transportation branch, believes that it is a mistake to look at mass transit as a replacement for the automobile. He believes that a system of mass transit is essential, but he also believes that it should be run efficiently. He wonders whether it is appropriate for taxpayers to be asked to pay for buses which run every half hour during the evening and carry no more than six or eight passengers per trip.

Lawrence maintains that a high deficit does not necessarily mean an inefficient system; it all depends on what you are trying to do. Edmonton Transit is operated as a service, not a business. Look, for example at the reduced fares for children. It costs the system no less to carry children than to carry adults. But if the city has decided that part of its service will be to offer these fares to children, its citizens must not be surprised to see a year-end deficit. The same is true of evening service. So few passengers ride Edmonton buses in the evening that it can cost the system three or four dollars for every rider paying his 40-cent fare. But again if the public demands the service, it must expect to pay the bill.

Even if we accept the notion that public transit is a service and may by definition have to lose money, are there new developments which can minimize the losses and improve efficiency? Small buses, for use in off-peak hours, and dial-a-bus systems have been suggested but Lawrence cautions that these are not magic solutions. "The only way you would save money by using mini-buses," he observes, "would be if you had a mini-driver with a mini-salary."

One situation in which the dial-a-bus concept might become attractive is in the off-hours. If small buses could collect people at their homes and take them to main-line transit zones, a reduction in the number of major routes might be realized. A novel variation on this was suggested by Lawrence. He claims that although the idea might seem "unspeakable" to many of his colleagues, perhaps transit systems could work in cooperation with taxi companies to provide such a coordinated system.

For the future, Lawrence would like to see "transportation and communications viewed as one concept." Technology is advancing at such a rate that for education and certain kinds of jobs, people really do not need to travel at all.

William Doucette of Alberta Government Telephones agrees. Doucette claims that the technology already exists to enable people to conduct business meetings, make purchases, do banking, and earn a Bachelor of Arts degree without leaving their homes. Facilities for staging video conferences exist in Quebec City, Montreal, Toronto, Calgary, and Edmonton. Audio conferences involving as many as 50 participants can be accommodated anywhere in Canada. Computer terminals can transmit information across the street or across the continent.

What of the automobile itself? Can it evolve into a transportation tool which takes less precious space, uses less scarce fuel, *A train in Edmonton's light rapid transit system*

and operates with less damage to our atmosphere? Fred Gibson of the Edmonton Motor Dealers Association says these changes are already taking place. Cars are shrinking in size and weight, taking less space and using less fuel, as people begin to realize that a 2 1/2-ton, six-passenger automobile just does not fit into city traffic.

Much work is also being done, according to Gibson, into alternative fuel and power sources for the automobile. For example, there is rapid growth in demand for diesel-powered cars. Diesel fuel requires less refining than gasoline, but its real advantage lies in the fact that it is more readily synthesized than its higher octane cousin. Another advantage of the diesel engine is its economy.

Gibson also notes that much work is being done on the development of storage batteries for electric cars. General Motors, he claims, has already built an experimental electric city car with a range of some 320 kilometres. Many people believe that pollution-free electric cars may be the next major evolutionary step for the automobile.

Roy Nourse of Canadian Western Natural Gas Ltd. says his firm has conducted some

promising experiments using natural gas to fuel 110 of its vehicles. The gas has a number of advantages, including the fact that it is 90 per cent clean burning and its cost is less than 20 per cent that of gasoline.

It requires a large storage tank and a very expensive compressor to fill it. Currently, converting a vehicle to run on natural gas requires a kit costing over $1,000. This cost can be reduced, however, because the Canadian Government provides tax relief for anyone acquiring equipment with energy-saving potential. Furthermore, if the fuel were to ever become widely used, vehicles designed for natural gas would be available and the conversion costs would be eliminated.

There are two reasons for enthusiasm over natural gas. Alberta has an abundance of the resource with more being discovered all the time. And not only do we have these extensive reserves, but natural gas can also be synthesized from coal and other biological materials.

Nourse believes that in the future vehicles may be operated on liquid natural gas. He says safe tanks are available and that LNG, which occupies less space, would be far more convenient.

Nourse also claims that the development with the greatest potential to solve the world's energy shortage would be the perfection of a photovoltaic system using the sun's energy to separate hydrogen from sea water. The United States government has provided $10 billion in research funds for the work, and according to Nourse, success would bring an almost limitless supply of energy.

Those who feel the private automobile can never be adequately replaced may find considerable comfort in the fact that much progress has been made in developing the technology for synthesizing fuel from renewable sources. A report published by the National Research Council's Energy Project states that methanol can be produced from natural gas, coal, lignite, peat, municipal solid waste, and forest byproducts. The Brazilian government is producing it from excess sugar cane. The Council states that more progress is needed, however, in research to make internal combustion engines which can accept either pure methanol or methanol blends. Some advances in Europe and South America have been made in adapting high-compression diesel engines to the new fuel.

To end our dependency on large, inefficient cars we must make significant social as well as technological changes. Will we adjust? In the 1930's the Doble Steam Car Company developed a vehicle which was very powerful, luxurious, and extremely convenient to operate. But while the company was perfecting steam car technology, the public was deciding that it wanted only the internal combustion engine. The Doble died. Will motorists of the eighties accept cars with steam engines or electric motors? Will oil companies agree to implement new power sources? Will drivers accept cars only half the size of those they have grown used to? Are people prepared to surrender convenience and privacy and accept mass public transit? Can we cope with the isolation of going to school by television and communicating via computer? Adjustments may be difficult, but declining fuel supplies, space and air quality may force a speedy adaptation on North America's urban dwellers.

Donald McMann is a magazine feature writer living in Edmonton.

If undelivered, return to:

Environment Views
Alberta Environment
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Environment Update

Source Book Available

The federal government has published an *Environment Source Book* as a guide to environmental information in Canada. The book contains information about government agencies and citizens' groups dealing with environmental issues. It also lists available literature, audio-visual aids and environmental studies programs at Canadian universities and community colleges.

The book, which should be particularly useful to teachers and researchers, can be obtained free of charge from the Communications Branch, Alberta Environment, 9820 106 St., Edmonton, Alta. T5K 2J6.

Report Prepared

The provincial recreation, parks and wildlife department has prepared a report on possible effects of an $8.8 million canal planned by Alberta Environment to control water levels on Lesser Slave Lake. The report indicates that if the project is allowed to go ahead, some of the lake's beaches, waterfowl nesting areas and fish spawning grounds may be destroyed.

Environment Minister Dave Russell said that the project, undertaken to counteract the effects of regional flooding, would not begin until a detailed environmental impact assessment study was completed. A local advisory committee of several knowledgeable citizens was formed in 1976 to provide advice and help with the problem, he said.

LAUREN DALE

Cars Fail the Test

Exhaust emission testing programs conducted in late October in Edmonton and Calgary showed a great majority of cars failing to meet air quality specifications.

Of 554 cars tested in Edmonton, only 27 per cent met specifications set out for their particular model and year. In Calgary, only 22 per cent passed with a clean reading. Technicians at test centres--sponsored by Alberta Environment, Environment Canada and the Alberta Motor Association--adjusted most of the "off spec" cars to minimum standards, but warned some owners that extensive work was necessary to bring their vehicles up to par.

Forests to be Replaced

The Alberta Forest Service will develop a "super tree" and begin replacing some of the 24,000 acres of coniferous timber lost each year to fire and industrial activity. The two goals are the main points in a seven-year, $25 million timber improvement program to be funded by the Alberta heritage savings trust fund.

Reforestation will be carried out in large blocks in selected areas of the province, such as the Slave-Athabasca area where one million acres were burned in 1968. Forestry workers will search out the most vigorous stands of pine and spruce in Alberta to provide seed stock for development of the "super tree."

Hearings Begun

Hearings began December 4 into Esso Resources' application to develop a $4.7 billion heavy oil extraction plant in the Cold Lake area. The hearings, held by the Energy Resources Conservation Board to look at the socio-economic, environmental and technical aspects of the proposed operation, will involve more than 60 interveners and are expected to conclude just before Christmas.

Snowmobile Laws Drafted

An Alberta transportation department spokesman says civil servants from several provincial departments are working with the Alberta Snowmobile Association and snowmobile dealers to draft legislation controlling the operation of snowmobiles in Alberta. Snowmobiles are now regulated by the Off-Highways Vehicle Act, but "because of their numbers and their exclusive use in winter" they should have a separate act, said Bob Cronkhite, assistant deputy transportation minister. The act is expected to spell out more clearly where snowmobilers are permitted to operate their machines.